Smith County
Emergency Services District 2

Smith County, Texas

Agency Evaluation Update—Master Plan and Strategic Plan

Final Report

Emergency Services Consulting International

Providing Expertise and Guidance that Enhances Community Safety

September 2019

LETTER OF TRANSMITTAL

September 3, 2019

Terry Rozell, Fire Chief
Smith County Emergency Services District 2
4128 Hwy 110 South
Whitehouse, TX 75791

Direct: 903.617.6578

Re: SC-ESD 2 Agency Evaluation Update—Master Plan and Strategic Plan

Dear Chief Rozell,

Emergency Services Consulting International, Inc. (ESCI) is pleased to provide this Agency Evaluation Update—Master Plan and Strategic Plan. This document was prepared in accordance with the information provided to the ESCI team with consideration to nationally recognized standards, industry best practices, available funding, and District operating philosophy.

ESCI thanks the leadership, members, and staff of SC-ESD 2 for their assistance in completing this final report.

Please contact me with any questions or requests for additional information.

Sincerely,

Mike Montgomery
Associate Consultant

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ACKNOWLEDGMENTS

Emergency Services Consulting International (ESCI) would like to thank the following Board and Staff Members of the SC-ESD 2.

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Administrative Assistant

Larry Locke
Director Information Technology

The men and women of the fire departments that serve
Smith County Emergency Services District 2
who sacrifice daily to tirelessly serve their community.

EXECUTIVE SUMMARY

Preface

Smith County Emergency Services District 2 was created in 2007 by successful passage of an election as authorized by Chapter 775 of the Texas Health and Safety Code and as ordered by the Smith County Commissioners Court. The election served to establish a geographical boundary with the authorization to establish a property tax rate not to exceed $0.10 per $100.00 assessed value.

Emergency Services Consulting International ("ESCI") was engaged by the Smith County Emergency Services District 2 ("SC-ESD 2," the "District") to provide a long-range master plan for the delivery of emergency services within the service area of Smith County, Texas. The results of this study are intended to assist the District and its service providers in future planning and the provision of comprehensive emergency services to the residents, workers, and visitors of the District service area. This report is organized as an analysis that evaluates current conditions; recognizes future growth, development, and service demand; and provides recommendations to enhance current services.

Smith County is located in East Texas, approximately 98 miles from Dallas. The County has a long and distinguished history dating back to 1846. Today, Smith County has a population of over 230,000 residents and is home to numerous higher education institutions, with rich cultural diversity.

The District has a challenging response area covering 712 square miles throughout Smith County and outside the city limits of Tyler, Texas, and smaller jurisdictions. There is a wide variety of population densities, geographic variances including large bodies of water and limited-access open-space. The jurisdictional boundaries around the cities of Tyler and Whitehouse affect agency response in some areas of the District; thus, the District must rely on internal resources to provide effective emergency response.

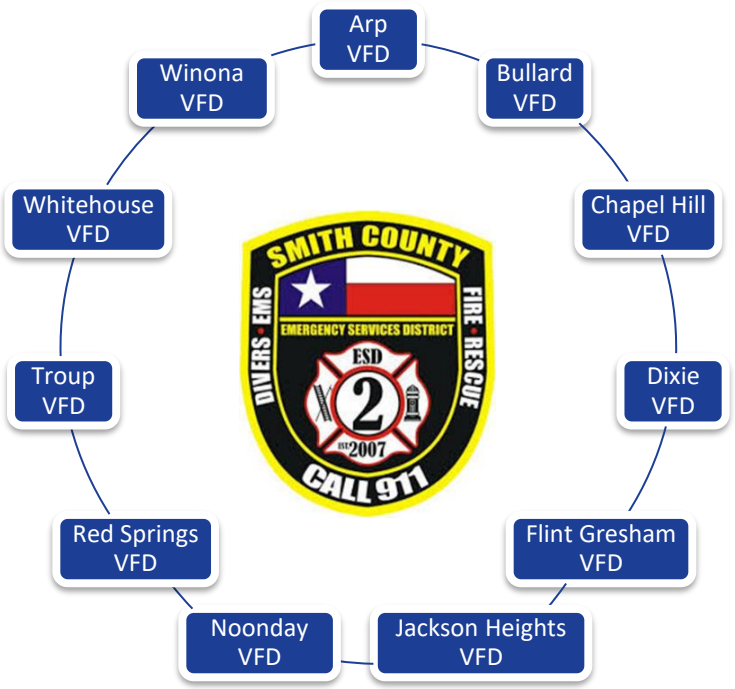
As of 2018, the District serves a population of 92,726 constituents, about 40 percent of the total population of the county. Over the past 25 years, the population growth outside of the City of Tyler has increased by 44 percent, with the majority of that growth in the District service area. This trend is expected to continue as is the growth of commercial development. Today, the area is predominantly rural with pockets of "urban cluster" development.[1] The scattered nature of the population over such a large area makes resource distribution a challenge, both today and in the future.

The District

SC-ESD 2 is a combination system comprised of District personnel, with both full-time and part-time employees, and volunteers associated with one of 11, independent service providers operating under service contract to the District as shown in Figure 1.

Each service provider is a 501(c) volunteer fire department. The District also has interlocal agreements for additional contract services with two additional departments—Van VFD and Mineola VFD—for services in the northwest corner of the District.

Figure 1: SC-ESD 2 Organization



Collectively, the SC-ESD 2 system provides a variety of emergency services including fire suppression, emergency medical services (first responder, non-transport), technical rescue, water rescue, and hazardous materials response. Support services include public education, fleet and facility maintenance, member training, and administrative support services. The goal of the District is to provide round-the-clock staffing with two paid personnel on duty to supplement volunteer personnel at each of the 11 departments. Given the current available funding, round-the-clock staffing is not possible at this time.

The District Fire Chief is the administrative head of the system and serves under the general supervision and direction of the SC-ESD 2 District Board of Commissioners. The District has 41 approved positions—seven administrative staff positions and 34 operations positions (24 full-time and 10 part-time), including four operations supervisors. Part-time positions are filled from a pool of 74 part-time employees. All told, the District's fire departments have about 290 volunteer members. However, this number is somewhat misleading in that only 54 members (18 percent of all volunteers on department rosters) are certified by State Firefighters' and Fire Marshals' Association of Texas (SFFMA) or Texas Commission on Fire Protection (TCFP) as structural firefighters and make more than 10 percent of their respective department's calls. This underscores the need for a combination system; that is, a system that includes both paid District personnel and department volunteers to ensure an adequate initial response with a sufficient number of personnel to perform critical tasks.

Key Findings

1. Many of the District's organizational and management methods are examples of best practices.
2. The District's current financial practices are sound, but future revenue adjustments are needed.
3. Staffing needs are critical and additional personnel, both paid and volunteer, are needed.
4. New stations will be needed in the future.
5. The District needs to develop formal plans for future operations and capital investments.

Organization and Administration

The District has established statements of its organizational mission, vision, and core values. Doing so establishes the foundation upon which the organization provides services to its community, and provides the features and considerations that make up the personality of the organization.

The District has a complete set of regulatory documents, both guidance and directive in nature. The regulatory documents are reviewed by District staff for consistency and for legal mandates, regularly updated, and communicated throughout the system.

Like other public safety entities, the District routinely faces a complex array of new critical issues and emerging challenges. The District Leadership Team, comprised of the District Fire Chief and the fire chiefs of the 11 contract service providers, has reached consensus on the following critical issues:

Critical Issue	Description
First	Station Staffing
Second	Cherokee County Response
Third	Training
Fourth	Infrastructure

These issues are supported by the findings of this study and are central to the recommendations provided in this report. It will be critical for the Leadership Team and District Board of Commissioners to develop strategies to address root causes and implement practical solutions in order to provide the best possible service to the community served.

Mission Statement

To be the leading emergency service district by meeting the needs of our community in fire prevention, fire suppression, rescue operations, and emergency medical response in the most effective manner possible.

Vision Statement

To utilize and improve the skills and dedication of our staff and volunteers and to constantly improve operations and services for the citizens of Smith County.

Core Values

Provide a safe, healthful, and environmentally responsible emergency response system.

Promote teamwork and support staff with adequate resources to attain superior performance.

Meet and/or exceed local, state, and federal emergency service agency standards.

Use a progressive operational model to facilitate superior service levels and administrative controls within available resources.

Actively recruit the best-qualified persons without regard to race, color, or creed.

Provide proactive, open communications within the organization, the community, and related organizations.

Financial Summary

Anticipated Revenue

The District has experienced a steady but moderate escalation in its property values during the previous four years. For projection purposes, property values are anticipated to grow at four percent annually. The following figure utilizes the certified taxable values, the current tax rate of $0.084648 per one hundred dollars of valuation for the FY 18/19 adopted budget, and continuation of current service fees as the starting point for five years of revenue projections.

Figure 2: Smith County ESD 2 Projected Property Tax Revenue, Adopted Budget FY 18/19–FY 23/24

Description	Adopted	Projected				
	FY 18/19	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24
Property tax						
Valuation	6,496,100,091	6,755,944,095	7,026,181,858	7,307,229,133	7,599,518,298	7,903,499,030
Tax Rate per $100	$0.084648	$0.084648	$0.084648	$0.084648	$0.084648	$0.084648
Property taxes assessed	5,498,819	5,718,772	5,947,522	6,185,423	6,432,840	6,690,154
Property taxes collected						
Collection rate	97.00%	97.00%	97.00%	97.00%	97.00%	97.00%
Current tax year	5,333,854	5,547,208	5,769,097	5,999,861	6,239,855	6,489,449
Prior tax years, penalties & interest	100,000	125,000	125,000	125,000	125,000	125,000
Total property taxes	**$5,433,854**	**$5,672,208**	**$5,894,097**	**$6,124,861**	**$6,364,855**	**$6,614,449**
Cherokee Co funds	44,616	44,616	44,616	44,616	44,616	44,616
Service billings	11,000	11,000	11,000	11,000	11,000	11,000
Recurring revenue	**$5,489,470**	**$5,727,824**	**$5,949,713**	**$6,180,477**	**$6,420,471**	**$6,670,065**

Nonrecurring revenue, a source typically difficult to predict, is projected at $50,000 for other receipts and an additional $6,000 per year for interest income on invested funds. The large anomaly in FY 18/19 results from loans obtained to construct two fire stations (expected completion date of August 2020).

Anticipated Expenditures

Operating expenses for supplies and services, using the adopted FY 18/19 budget as a starting point, are projected to increase at annual rate of three percent each year during the five-year projection period. There will need to be some adjustment based on the anticipated addition of two more stations with full, round-the-clock, 24/7 staffing with two paid firefighters at each station, plus one additional station staffed on a 9-hour per day basis, contingent upon need and the availability of funding.

Likewise, capital expenditures for the construction of new Arp Station 1 and Flint-Gresham Station 1 are estimated at $2,000,000 for each station. These costs are projected to be divided between FY 18/19 and FY 19/20 in an amount of $1,500,000 and $2,250,000 respectively. Similarly, the District is in the process of implementing a formal apparatus replacement schedule. For projection purposes, it is anticipated that an engine will be replaced in each of the first, second, fourth, and fifth years and a ladder truck will be replaced in the third year of the projection period.

The following figure shows projected expenditures for the revised FY 18/19 budget through FY 23/24.

Figure 3: Smith County ESD 2 Projected Expenditures, Modified Budget, FY 18/19–FY 23/24

Expenditures	Revised	Projected				
	FY 18/19 Budget	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24
Salaries/wages	1,983,058	2,147,025	2,268,736	2,336,798	2,406,902	2,479,109
Benefits	285,000	338,658	366,620	380,119	394,148	408,728
Total salaries and wages	**2,268,058**	**2,485,683**	**2,635,356**	**2,716,917**	**2,801,049**	**2,887,837**
Administrative expenses	968,550	997,607	1,027,535	1,058,361	1,090,112	1,122,815
Operations expenses	1,147,700	1,182,131	1,217,595	1,254,123	1,291,746	1,330,499
Contingency	40,000	-	-	-	-	-
Total recurring expenses	**4,424,308**	**4,665,421**	**4,880,486**	**5,029,400**	**5,182,907**	**5,341,151**
Principal	1,105,500	337,045	349,684	362,798	376,403	390,518
Interest	20,000	150,000	137,361	124,247	110,642	96,527
Debt service	1,125,500	487,045	487,045	487,045	487,045	487,045
Land	-	-	-	-	-	-
Buildings	1,500,000	2,500,000	-	-	-	-
Apparatus	-	500,000	500,000	1,500,000	500,000	500,000
Other equipment	203,000	-	-	-	-	-
Total Capital	1,703,000	3,000,000	500,000	1,500,000	500,000	500,000
Total non-recurring expenditures	**2,828,500**	**3,487,045**	**987,045**	**1,987,045**	**987,045**	**987,045**
Total expenditures	**7,252,808**	**8,152,466**	**5,867,531**	**7,016,445**	**6,169,952**	**6,328,196**

Anticipated Cash Flow

The following figure shows the expected effect of anticipated expenses with no adjustment of revenue.

Figure 4: Smith County ESD 2 Projected Cash Flow from Operations Budget, FY 18/19–FY 23/24

Description	Adjusted	Projected				
	FY 18/19	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24
Total revenues	9,707,470	5,783,824	6,005,713	6,236,477	6,476,471	6,726,065
Total expenditures	**7,252,808**	**8,152,466**	**5,867,531**	**7,016,445**	**6,169,952**	**6,328,196**
Net Cash Flow (Deficit)	**2,454,662**	**(2,368,642)**	**137,642**	**(779,968)**	**306,519**	**397,869**
Impact of Staffing Recommendations						
Operations staff	-	294,558	301,236	308,116	315,200	322,498
Administrative staff	-	83,955	86,474	89,067	91,740	94,492
Adjusted Cash Flow (Deficit)	**2,454,662**	**(2,747,155)**	**(250,068)**	**(1,177,151)**	**(100,421)**	**(19,121)**
Beginning Cash	2,115,536	**4,570,198**	**1,823,043**	**1,572,975**	**(395,824)**	**(496,245)**
Ending Cash	**4,570,198**	**1,823,043**	**1,572,975**	**(395,824)**	**(496,245)**	**(515,366)**

Note the potential negative cash balance beginning in FY 21/22 and continuing forward. This suggests budget adjustments and/or additional source of revenue may be required given these projections.

Planning Processes Summary

The planning process within the SC-ESD 2 has satisfied the District's needs to date. While the community has grown and developed, the District has been able to provide the level of service desired by the community. SC-ESD 2 is now facing several challenges related to the delivery of fire service within the community that will require the planning efforts of the District to be more formally integrated within the community it serves. To be truly effective, an emergency services system must consider planning for the future on five distinct levels: Master, Strategic, Operational, Tactical, and Community Risk.

SC-ESD 2 performs some fundamental, short-term planning in the form of the annual budget development process, which is used to define the activities and priorities identified for the upcoming year. However, the District has not established a formalized and adopted planning process, and historical planning has been limited to some basic strategic planning efforts, pre-incident planning, and annual work plan development. Commendably, recent initiatives have been implemented to address planning needs including this master planning process as well as a strategic plan.

Capital Assets and Capital Improvement Program Summary

SC-ESD 2 is currently facing dynamic, fast-paced changes in response capabilities and staffing plans. These changes are required to meet the emerging needs of the District at the region transitions from predominantly rural, bedroom communities to urban pockets and the associated challenges related to these growth patterns.

Facilities

In 2012, SC-ESD 2 developed a 10-year plan for the remodel/replacement of stations and the purchase of apparatus. By 2018, four years ahead of schedule, SC-ESD 2 has accomplished many capital and facility goals, including the completion of Chapel Hill, Dixie, and Winona stations. Arp Station 1 and Flint-Gresham Station 1 should be completed by August 2020. The current ESCI analysis shows a need to replace the administration facility and consider the future construction of a District training facility.

Several SC-ESD 2 stations are in good to excellent condition and with some basic upgrades, including living quarters for volunteer and paid personnel, will serve the District well into the future. The District put forth a staffing goal to provide 2-person paid staffing, supplemented by active and certified volunteers, round-the-clock, in all 11 departments, contingent upon available funding. This process is supported by community service demand, but will require numerous facility upgrades to ensure safe, efficient, and code-compliant facilities. Wherever possible, this can be accomplished through the use of temporary living quarters that can be obtained and moved on location fairly quickly at a low cost and with maximum flexibility.

The most notable challenge identified in this process is the inconsistency throughout the District of station design, capacity, and capability. This is certainly expected with the coordination and harmonization of 11 independent fire departments. One immediate need that was identified is the need for replacement and paving of the driveway/apparatus pad at Jackson Heights Station 1 as shown in Figure 5.

Figure 5: Jackson Heights Station 1 Driveway and Apparatus Pad

Apparatus, Other Vehicles, and Small Tools and Equipment

SC-ESD 2 has demonstrated an excellent capacity for the planning and implementation of a program for capital assets. The 10-year capital plan developed in 2012 also included the replacement of apparatus. At the time, 18 apparatus were considered in need for replacement over the next 10 years. This includes engines, aerials, tankers (water tenders), rescue units, and brush trucks. SC-ESD 2 has already replaced six units, and five more have been withdrawn in order to streamline the number of apparatus in the District, leaving six units to be replaced by 2025.

Over time, ESCI recommends this plan be converted to a rolling, 10-year plan that includes target replacement dates and source of funds. The plan should also include an audit of compliance with applicable standards, equipment usage, and need to assist the District with the evaluation, maintenance, upgrade, and replacement of heavy fire apparatus (engines, tankers, and ladder trucks), other vehicles, and small tools and equipment.

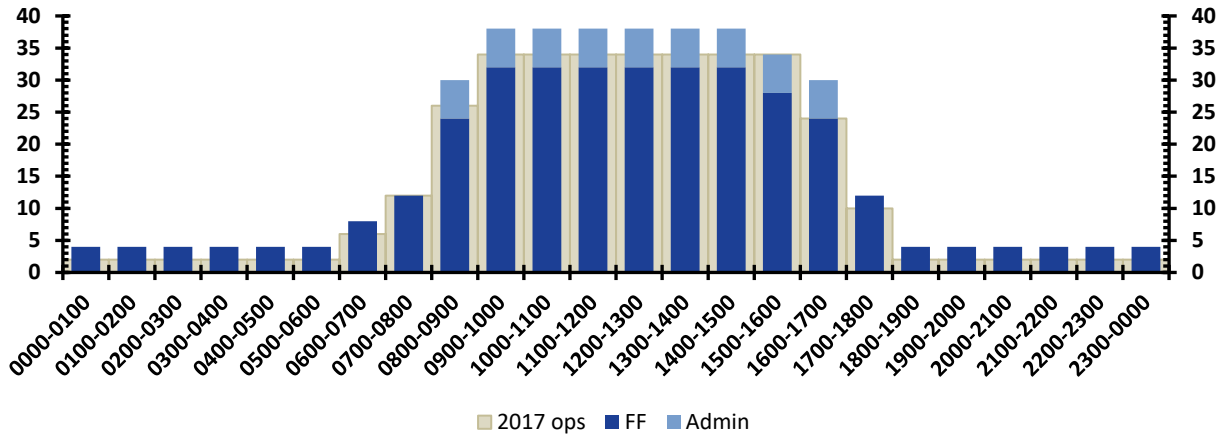
Additional capital equipment and facility upgrades will be required, especially in conjunction with the progression to round-the-clock staffing models. A plan for capital equipment such as SCBA, compressors, small equipment, rescue tools, and radios should be maintained separately, but linked to the facilities and apparatus plans to ensure equipment interoperability and connectivity with those plans.

Staffing

As described previously, SC-ESD 2 is a combination system comprised of District personnel, with both full-time and part-time employees, and volunteers associated with one of 11, independent service providers. The District Fire Chief is the administrative head of the system and serves under the general supervision and direction of the SC-ESD 2 District Board of Commissioners.

Staffing is considered to be the primary challenge facing the District over the next five years. The goal of the District is to provide round-the-clock staffing with two paid personnel and two volunteer personnel at each of the 11 departments. However, given the current available funding and lack of active volunteers, round-the-clock staffing is not possible at this time, and as shown in the following figure, there are at least four operations personnel on duty around-the-clock, seven days a week. From 0700 to 1700, Monday through Friday, at least 10 operations personnel are on duty. During peak hours from 0900 to 1500, Monday through Friday, there are a total of 38 certified firefighters on duty—32 operations personnel and 6 admin personnel (1 Mechanic certified as a Firefighter, 2 Captains, 2 Battalion Chiefs, and the Fire Chief). Overall, there has been a net increase in the number of operational staff on duty when compared to 2017. This is due to increasing need and availability of funding. These operational staffing increases are shown in the following figure.

Figure 6: Operational Staffing Levels, Monday–Friday, by Hour of Day



The District has 41 approved positions—seven administrative staff positions and 34 operations positions (24 full-time and 10 part-time), including four supervisors. Part-time positions are filled from a pool of 74 part-time employees. Each of the 11 service providers are volunteer fire departments with a Board of Directors, volunteer Chief, members, and independent rank structure. Collectively, the 11 departments of SC-ESD 2 have about 290 volunteers. However, this number is somewhat misleading. Consider this:

- Total number of people carried on rosters for all departments in SC-ESD 2 **290**
- Total number of people that made less than 1 call per month for 2018 **110**
- Total number of people that made at least 10% of calls for their department **94**
- Total number of people that made 10% of the calls for their department AND were certified by either SFFMA or the TCFP to make entry. **54**

Thus, only 18 percent of all volunteers on department rosters are certified by SFFMA or TCFP as structural firefighters and make more than 10 percent of all department calls. As stated previously, this underscores the need for a combination system; that is, a system that includes both paid District personnel and department volunteers to ensure an adequate initial response with a sufficient number of personnel to perform critical tasks. This is the most critical issue facing the District at this time.

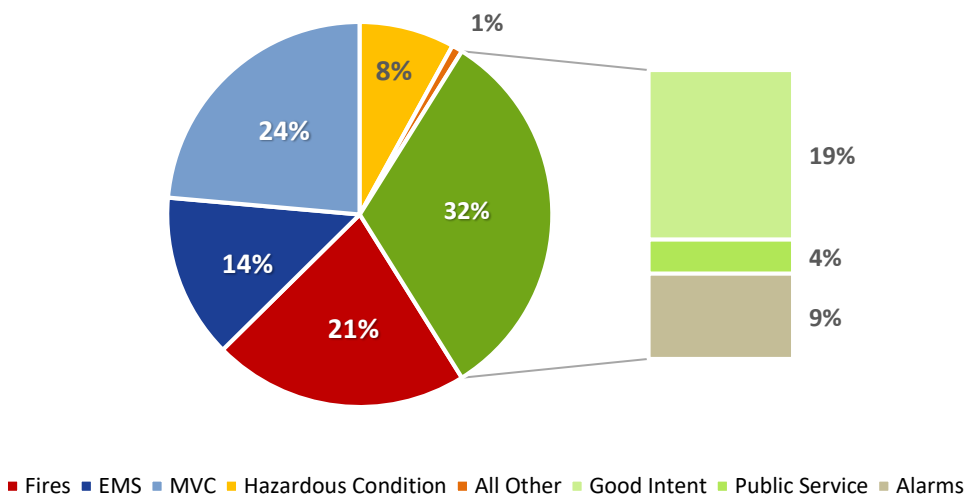
Service Delivery and Performance Summary

Incident type

Due to changes in incident reporting systems and other factors, it is believed that the 2017 data is incomplete and does not accurately reflect the entire year. However, the information provided does provide valuable insight into District operations. Based on the information provided by the District, emergency responses varied significantly by call type over the course of the study period:

- 21 percent of all responses were for fires
- 24 percent were for motor vehicle collisions (MVC)
- 14 percent were for emergency medical calls not involving MVC
- 8 percent were for hazardous conditions
- 1 percent were for other emergencies
- 32 percent were responses where no emergency existed
    - 23 percent were "good intent" or "public service" calls
    - 9 percent were false alarms

Figure 7: Service Demand by Incident Type, 2017–2018



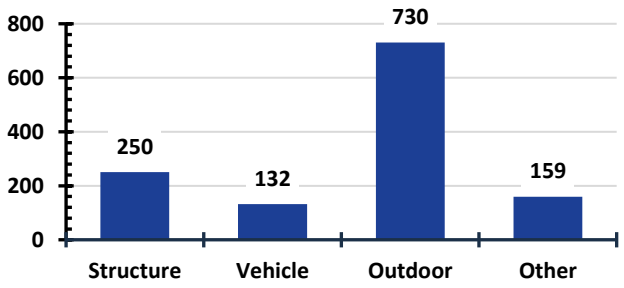
Clearly, the data indicates that most service demand—79 percent—is for emergencies that are not fires. In fact, the most-common response type is to accidents involving MVC. This is not surprising given the number of major transportation routes, including IH-20, and smaller two-lane roads that cross the District.

Of note is the high percentage of non-emergency calls—32 percent of all calls. Almost one in three calls for service turns out to be a non-emergency; almost one in ten is a false alarm.

This suggests there is an opportunity for public education to reduce the number of non-emergency calls. That is not to suggest that citizens should be discouraged from calling for service; it simply indicates that there is a risk of extended response times if the nearest unit is already committed on a non-emergency call when an emergency call in the same area is received.

Also of note is the number of fire calls—21 percent of all calls for service. This is higher than ESCI finds for most jurisdictions in Texas (about 4 percent of all calls). Of all fire calls, 20 percent were for structure fires (including fires in mobile homes, motor homes, and camping trailers), 10 percent were vehicle fires, 57 percent were for outdoor fires, and the remaining 13 percent were not categorized. This is shown in the following figure. Of significance is the large amount of outdoor and other fires—about 70 percent of all fires as compared to 53 percent for all Texas fire departments.[2] Given the rural nature of the District, this is to be expected.

Figure 8: Fire Responses by Type, 2017–2018

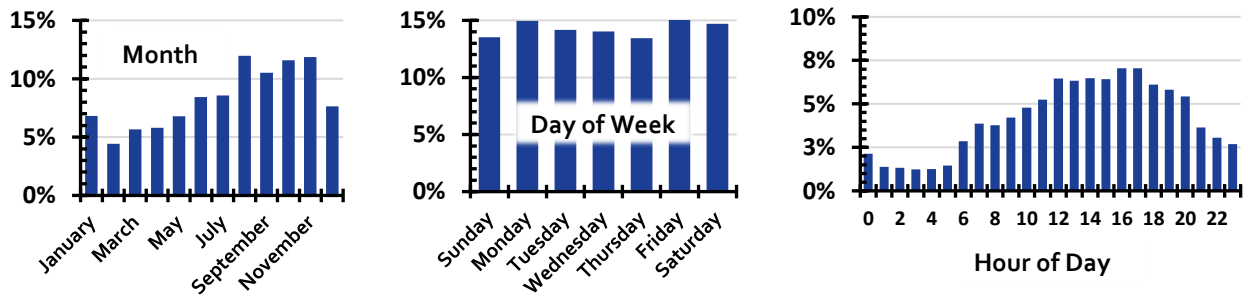


In light of the limited funding available, the relatively low number of structure fires—4 percent of all responses—suggests that the model currently used by the District of two-person paid staffing supplemented by two or more volunteers may be the most appropriate, if multiple units are dispatched to ensure arrival of an effective response force that is sufficient to accomplish required tasks.

Temporal Variation

Temporal variation analysis—a study of when calls occur—is helpful in order to determine if there are specific trends where staffing can be modified to better fit demand. The next figure illustrates temporal service demand for all incident types during the study period. These patterns are typical of temporal patterns for emergency response and support the increased day staffing model used by the District.

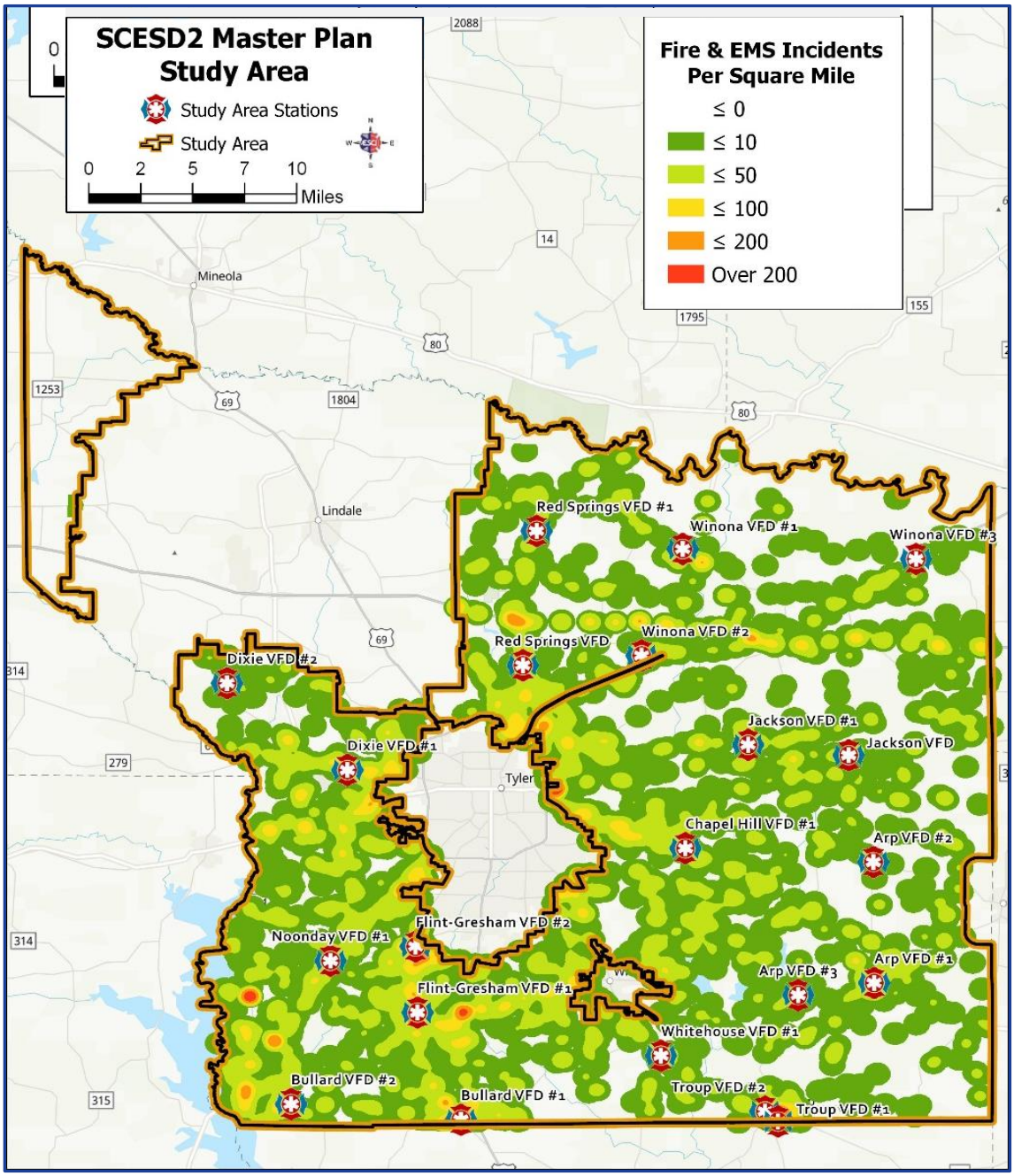
Figure 9: Summary of Temporal Service Demand, 2017–18



Geographic Service Demand

In addition to the temporal analysis, it is useful to examine the geographic distribution of service demand to assist with the location of facilities and distribution of resources. As shown by the following figures, geographic service demand is fairly evenly distributed throughout the entire service area. "Hot spots," or areas of greatest activity, appear in warmer colors. Note that more incidents occur in populous areas, with the greatest concentration just outside the city limits of Temple and along arterial roads, especially the IH-20 and SH-69 corridors.

Figure 10: Incident Density (Hot Spot Analysis), January 1, 2017–December 19, 2018



ISO® Public Protection Classification (PPC®) Summary Distribution

The Insurance Services Office (ISO), a subsidiary of Verisk Analytics, is a national data analytics provider that evaluates fire protection for communities across the country. ISO assesses fire protection through the use of a Fire Suppression Rating Schedule (FSRS) that details specific requirements for each of four major categories—emergency communications, fire department, water supply, and community risk reduction. Following an on-site evaluation, an ISO Public Protection Classification (PPC®) rating is assigned to the community ranging from 1 (best protection) to 10 (no protection). Currently, each department and community within the District maintains a separate ISO public protection classification (PPC®) for all properties located within its respective service area and within five road miles of a fire station as shown in the following figure.

Figure 11: ISO PPC® Classification, 2009 vs 2015

Community	2009		2015	
	With Hydrant	No Hydrant	With Hydrant	No Hydrant
Arp VFD	7	9	3	6
Bullard VFD	6	9	3	5
Chapel Hill VFD	6	9	4	7
Dixie VFD	6	9	3	5
Flint-Gresham VFD	6	9	3	5
Jackson Heights VFD	9	10	5	5
Noonday VFD	7	9	4	4
Red Springs VFD	10	10	5	5
Troup VFD	7	9	3	6
Whitehouse VFD	6	9	4	4
Winona VFD	7	9	4	4

There has been some discussion about pursuing a single ISO PPC® classification for the entire District. ESCI strongly recommends this initiative be reviewed by an independent ISO study to determine the potential impact on District residents and businesses before any action to consolidate ISO classifications.

Response Standards and Summary Results

Four measures of response performance and reliability were analyzed in this study:

- Unit Hour Utilization Rate
- Total Response Time
- Concurrent Call Volume
- Mutual and Automatic Aid

Unit Hour Utilization Rate

In this context, unit hour utilization (UHU) describes the amount of time that a unit is not available for an emergency response because it is already committed elsewhere. UHU is an important statistic to monitor for fire agencies that use percentile-based performance standards such as NFPA 1720. In this case, UHU levels greater than 20 percent mean that the response unit will not be able to meet response time goals. A UHU level over 25 percent indicates a system that is consistently being stretched beyond its limits.

With one exception, UHU levels within the District are below 10 percent, with the exception being Winona at about 10.5 percent. On average, the commit time—the amount of time a District unit was assigned and committed to an incident—was just over one hour. Overall, this indicates that all suppression and support units should be statistically available to meet response objectives based on availability alone.

That said, it is important to note that eight percent of all calls had commit times exceeding 10 hours and were excluded from the analysis. Further analysis is suggested to determine if these anomalies were due to data input errors or actual extended responses times. When included, these incidents pushed UHU rates as high as 40 percent. If these truly are incidents with long travel distances or extended incident times, back-in assignments may need to be considered to control UHU while those calls are in progress.

Total Response Time

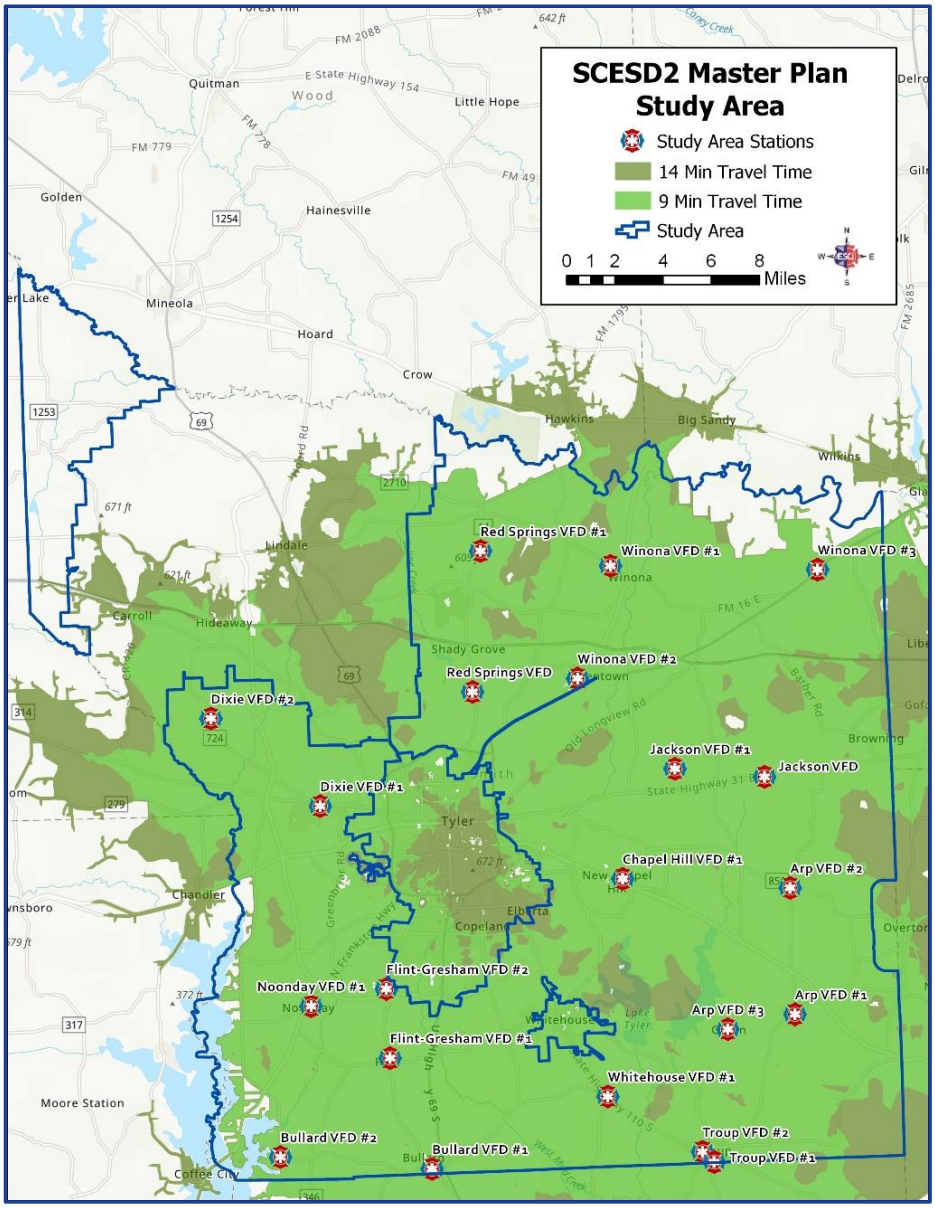
The appropriate response standard for the District, a combination system that relies on "substantially volunteer" staffing and responds to variety of service demand zones—urban, suburban, rural, and frontier—is NFPA 1720: *Standard for the Organization and Deployment of Fire Suppression, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments*. This standard establishes expectations for department response times as shown in Figure 12.

Figure 12: NFPA 1720 Response Time Classifications

Demand Zone	Demographics	Response Time	Objective Percentage
Urban Area	> 1,000 population/mi^2	9 minutes	90%
Suburban Area	500–1,000 population/mi^2	10 minutes	80%
Rural Area	< 500 population/mi^2	14 minutes	80%

As shown in the next figure, virtually all of the District's service area falls within the recommended travel time ranges for all demand zone types. This indicates that stations are placed appropriately, given current population density road networks, and available funding.

Figure 13: NFPA 1720 Deployment Analysis, 9- & 14-Minute Projected Travel



However, the travel time model does not measure actual travel time performance, nor does it account for the time required for call processing or department turnout time. When these are considered, District performance does not consistently meet these expectations. In some cases, this is simply due to the location of the call and the time it takes a crew to assemble and respond to the scene.

When response performance is examined at the 80th percentile, District response times exceed NFPA 1720 requirements for all types of incidents as well as overall performance. Based on the data provided, it is clear that citizens should anticipate extended response times, especially in remote areas. The District should continue to improve the collection and periodic review on performance metrics in order to optimize short-term staffing decisions and longer-term decisions about station location and resource deployment. potentially adding additional stations to the system.

Concurrent Call Volume

Concurrent Incidents

A second key indicator in assessing system reliability is call concurrency. Call concurrency examines the frequency of multiple calls occurring at the same time that units are still committed to a previous call. On average during the two-year study period, single incidents accounted for slightly more than one out of every four incidents—almost 27 percent—for the District. Over 36 percent of the time, two incidents were occurring in SC-ESD 2's service area; and about 37 percent of the time, the District was responding to three or more incidents at the same time, thus reducing its available resources.

Mutual and Automatic Aid

With the creation of the District, the combined resources of the 11 volunteer departments have resulted in an increase in resources and depth in emergency responses. The District has established mutual and automatic aid agreements with the majority of perimeter departments. There are two opportunities to improve existing aid agreements. These are with the City of Tyler and the City of Whitehouse. ESCI recommends that the District continue to remain open to the development of a closest-unit response model with these jurisdictions.

Support Programs Summary

Training

Training and education of personnel, both paid and volunteer, are critical, ongoing functions for the District. All new District firefighters receive pre-employment training from others and in compliance with TCFP requirements. There is no minimum standard of required training for volunteer firefighters, but volunteer members have the opportunity, and are encouraged, to seek firefighter training and certification through either the SFFMA or the TCFP. Personnel are not trained in specialized rescue operations due to the utilization of regional response teams. Most personnel have received medical training through online providers or local community college programs. Several members also hold basic wildland firefighting and hazmat operations certifications.

There is an opportunity to standardize training programs and their administration, by both the District and the system departments, with the development and implementation of a formal, multi-year training plan. There is also an opportunity to establish a dedicated training facility within the District. Although the District has access to the use of other training facilities in the area, distance, availability, and scheduling are often a challenge and take units out of service while out of District. ESCI considers the need for a high-quality training facility to be a high priority for the District despite the significant capital investment and on-going cost of operating and maintaining a training facility.

Current industry standards for the amount of training delivered are typically based on contact hours. An hours-based approach may be appropriate and effective in some cases, but the District would be better-served by shifting toward a task book, competency-based system of training and evaluation. This transition will require consistent and accurate documentation. Currently, the District lacks a centralized process for compiling training records from the separate fire departments. Thus, it is difficult to complete an accurate record of training statistics for the entire organization. ESCI considers this need for centralized, consistent, and readily-accessible training records necessary for this transition to be successful.

Life Safety Services (Fire Prevention and Community Risk Reduction

Generally, life safety services are the responsibility of the Smith County Fire Marshal's Office. There is an opportunity for the District to conduct risk assessment, incident pre-planning activities, and public fire safety education as mid-to-long terms strategies to develop a fire-resistant community and reduce the number of emergency responses. However, given scarce resources, emergency response must remain the short-term priority.

Community Risk Assessment

As can be expected, Smith County is susceptible and vulnerable to a variety of risks. While it is impossible to consider all hazards that are possible for all individual occupancies within Smith County, the study was able to identify the potential general risks most common to the study area. Historic incident data provided valuable insight into overall service demand across the District. Three key findings were:

- Overall, emergency responses are fairly evenly spread across the entire District, with more calls in more populous areas, as expected.
- A majority (52 percent) of all emergency service demand is associated with outside properties, highways, and streets. This is directly linked to the large number of MVCs (24 percent of all incidents) and outside fires (57 percent of all fires and 12 percent of all incidents).
- Over one-third (36 percent) of all emergency responses are associated with residential properties, typically one- or two-family dwellings. This is directly linked to the number of residences when compared to all other property uses and the traditional pattern of the number of emergencies that occur in the home.

In addition to fire- and EMS-related incidents, natural hazards pose additional risk to the study area. Most common of these natural hazards are flooding associated with severe storms (both tropical and seasonal), wildfires, tornadoes and other high winds, and ice storms.

The District has a number of high-risk occupancies—public and private schools, college buildings, medical and congregate care occupancies, and a growing number of processing/logistics centers. Transportation corridors—over-the-road and rail—and facilities like the commercial/general aviation Tyler Pounds Regional Airport have specific risk, often involving potentially hazardous materials. The arterial road system includes IH-20, SH-69, and several other major roadways. As with any geographic location, Smith County is a potential target for terroristic activities, including public gathering events throughout the year. Finally, there are a number of at-risk population groups—children under 5 years of age, the elderly, people living in poverty, and those where English is not spoken well—that live, work, and visit Smith County and may require special services.

Emerging Trends to Watch

Population Growth Projections

The projected growth for the Smith County area is about 1.3 percent annual growth, and is expected to reach over 108,000 population by 2030. For years, demographers cited a population triangle bordered by Dallas-Fort Worth to Austin and San Antonio; this trend has now shifted eastward and is impacting major parts of East Texas. Key trends to expect are businesses and retirees relocating into Smith County for several factors. These population trends will be accompanied by increased over-the-road and rail traffic along IH-20 and other area highways, plus higher demand for healthcare facilities and emergency medical services. The domestic migration will also include young families, more rooftops, and the potential for higher-value jobs. These population changes could have a significant impact on future service demands.

Service Demand Projections

Service demand is expected to rise at a faster rate than due to population growth alone, at a growth rate of about 2 percent each year. It is recommended that the District continue to monitor call volume and performance metrics to determine the impact of changes in population and economic development on service demand forecasts. Changes in service demand may require adjustments in the deployment of staffing and capital assets in order to maintain acceptable levels of performance.

Conclusions and Recommendations

Response Time Performance

ESCI emphasizes the importance of establishing and regularly monitoring performance metrics for the deployment of resources. These metrics serve as the foundation for determining whether or not the organization is meeting the expectations of the community that it serves. Without regular and consistent performance evaluation, it is impossible to set and achieve goals established to meet community expectations.

Response standards are individual to each organization and must originate from the community achieve create a balance between what is needed, what is desired, and what can be afforded. Because benchmarks are intended to represent a goal that should be achievable, it is recommended that the District consider a performance goal of 14 minutes response time with an acceptable Emergency Response Force (at the 90th percentile) once a call is received and units are dispatched. Once improvements are made and that target is achievable, additional target goals may be established.

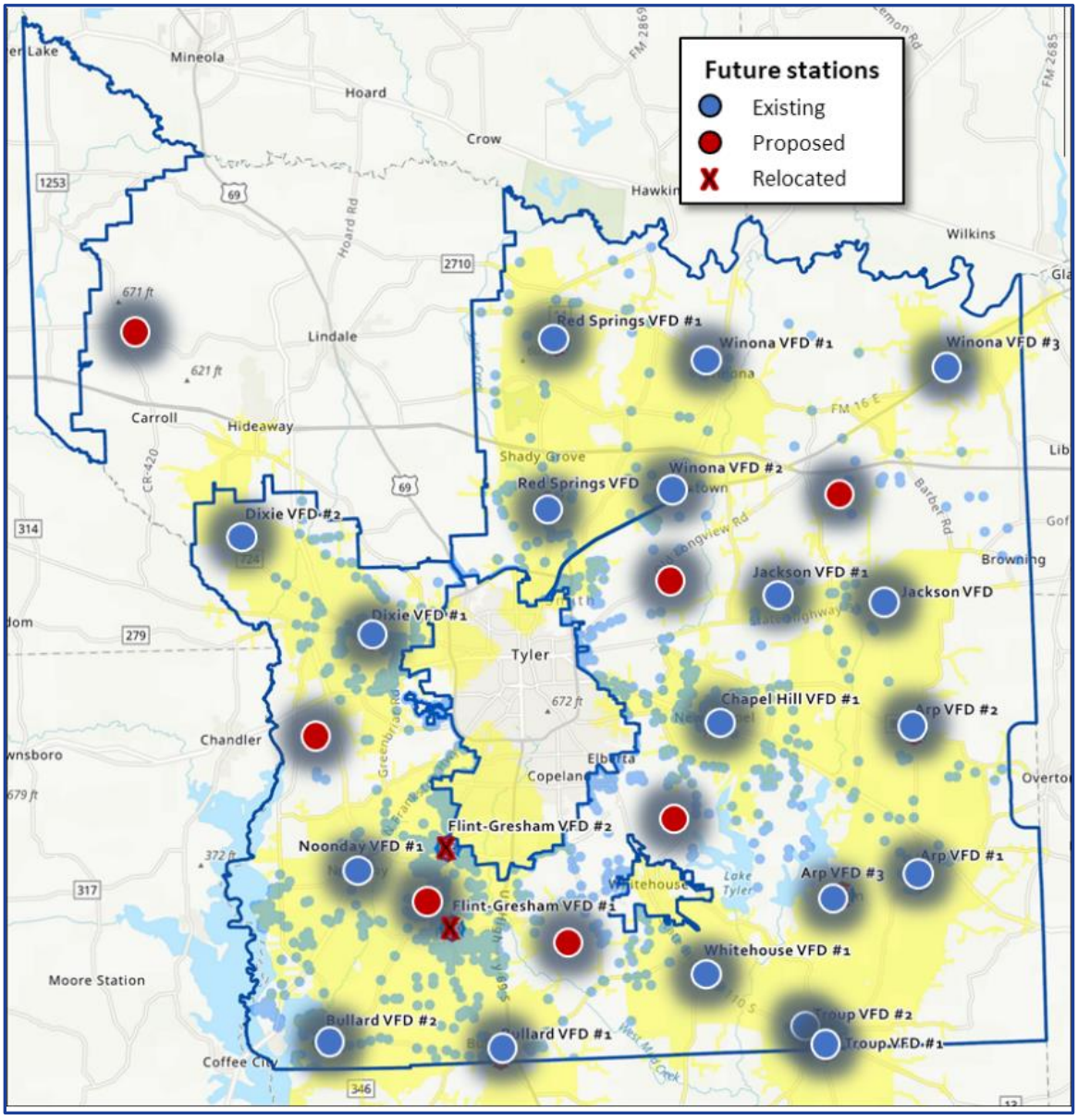
Critical Tasking and Alarm Assignments

The service area includes a variety of response types and population densities, and this presents varied staffing and deployment needs at an incident. The number and types of critical tasks that need simultaneous action will dictate the minimum number of firefighters needed on an initial response.

Fire Station Location

Many of the highly populated areas within the District service area fall within the five-mile travel distance necessary for a favorable ISO fire protection rating. Generally speaking, ISO is most concerned with the provision of fire suppression services to populous, contiguously built-upon areas. Water supply availability also plays a role in this improved rating, whether it be from a central water system or from a mobile water supply such as a water shuttle. The following figure shows conceptual locations for additional stations as part of the District's long-term strategy. These locations are conceptual only, and anticipate the continuation of historic population growth and in-fill economic development.

Figure 14: Potential New Station Locations, Concept Only



Short and Mid-Term Strategies

As mentioned previously in this report, the leadership team for the District—the fire chiefs of the 11 contract departments and the District Fire Chief—reached a consensus of the following critical issues facing the organization, as shown in Figure 15. The recommended short- and mid-term strategies address each of these concerns in consideration of anticipated population growth and changes on demographics within the District.

Figure 15: District-Identified Critical Issues

Critical Issue	Description
First	Station Staffing
Second	Cherokee County Response
Third	Training
Fourth	Infrastructure

Staffing

Operational Positions

Staffing is the most critical situation for the District. Given the call volume and available funds, a combination system that includes both paid District personnel and department volunteers appears to be most appropriate. However, it is a challenge to ensure an adequate initial response to arrive in a timely manner with a sufficient number of personnel to perform critical tasks. Volunteers are simply not available at all times, and the number of trained volunteers is an ongoing factor of concern.

Short-term, the District should continue with its plan to staff stations with two paid personnel and additional, available volunteers based on need and service demand. The number of stations that can be staffed is based on the availability of funding; the size of the available labor pool appears to be sufficient in the short-term.

Given the current available funding, round-the-clock staffing at all departments or stations is not possible at this time. As a result, it is recommended that the District continue its practice of round-the-clock staffing at two or more stations, augmented by daytime staffing at stations strategically located across the District, and staffed by volunteers at all other times. As the need for paid staff continues to increase, additional stations strategically located throughout the District may be added to the staffing plan.

Administrative Positions

Based on a total paid response staff of 55, HR functions performed by staff are within industry guidelines. However, with the addition of approximately 300 volunteer firefighters and the potential for additional paid staff, ESCI recommends that the District hire a full-time, dedicated HR Specialist sometime in the near future. This position would be a 40-hour per week, non-exempt administrative position with full benefits.

Also, the District should consider hiring a part-time Fire/Life-Safety Educator to enhance and coordinate its public education program. Later, if job functions and workload suggest the need, this position could be converted to a 40-hour per week, non-exempt administrative position with full benefits.

Cherokee County Response

Two District departments—Bullard VFD and Troup VFD—have primary response zones that include territory in Cherokee County and outside the District's service area. These out-of-county response zones were never included within the original boundary of the ESD, although this was an option under Texas Law. There does not appear to be any particular cost allocation formula used to determine the amount Cherokee County pays the District for the services it receives.

When two or more communities share in providing fire protection, elected officials must assure that each community assumes only its fair and equitable *pro rata* share of the cost, thereby fulfilling an obligation to act as stewards to the best interest of their respective constituencies. Given recent concerns voiced by some District taxpayers, it may be time to consider discussions about alternatives to the current cost allocation model.

Training

As is required by State Law, the District provides ongoing in-service training and maintains training records for the paid staff of the District. Training records are periodically audited by the Texas Commission on Fire. The district also offers its in-service training to the members of its contract service providers. These practices should continue, along with the development and implementation of formal training programs, pre-planning activities, and centralized documentation.

Infrastructure

The District has a good sense of direction regarding infrastructure—fixed facilities, apparatus, emergency and support tools and equipment, and technology. Projects are implemented on a needs-based, pay-as-you-go strategy and this has been beneficial to both the District and the community served. There is an ongoing need to continue the upgrade of existing facilities and the future relocation/expansion of others. The addition of crew quarters in all stations and a new administration/operational support building are priorities.

Capital improvement plans are mostly *ad hoc*, and rely more on addressing potential problem areas rather than on formally-planned and scheduled replacement of capital items. That said, there has been clear improvement in several areas, most notably physical infrastructure, apparatus, and technology.

Short- and Mid-Term Recommendations

Staffing

- Conduct focused recruitment in areas where individuals are not looking for an urban department but desire a department with an excellent reputation for service delivery in a rural setting. Utilize social media and recruitment at local, regional, and state EMS conferences. Assign one staff member per station to coordinate.
- Evaluate the feasibility of three-person paid staffing if number of active, certified volunteers falls below numbers needed to consistently provide a minimum of two volunteers per department round-the-clock in higher volume stations and during peak times at lower volume stations.

Cherokee County Response

- Review the current cost allocation process to ensure fair and equitable reimbursement for services provided by the District to others in Cherokee County.
- Consider the adoption of a funding plan that is based on a cost apportionment formula, limited to available funds, that is in accordance with State law, includes input from all interested stakeholders, and is agreeable to all officials affected by the agreement(s).
- Consider a phased approach that includes a short- to mid-term adjustment in the funding process, with a long-term goal of integrating periodic reviews of the funding principles into the District's Master Plan.

Training

- Develop an annual training plan based on periodic training needs assessments with defined annual program goals, objectives, performance measures, and monitoring processes that are based on the needs assessment.
- Establish target hazard lists in order to prioritize the completion of a pre-plan.
- Establish a pre-fire planning program with an assigned coordinator in each station.
- Provide training on the pre-fire planning process and its use.

Other Recommendations

Governance and Administration

- Conduct periodic staff meetings and take minutes for the senior, company, and/or staff meetings.
- Develop member newsletters to ensure that communication is distributed throughout the system.
- Explore and pursue consolidation of all administrative activities into the District's responsibilities to eliminate as much duplication of efforts as possible.

Assessment and Planning

- Develop and publish a strategic plan that includes the review of mission, vision, and value statements to shorten them and ensure that they are meeting the needs for today and the future.
- Review at least one-third of the SOGs/Rules and Regulations document(s) each year to ensure that the complete set is reviewed and revised every three years or less.
- Utilize community involvement with surveys and/or community meetings.
- Continue active participation in LEPC to ensure that hazardous materials sites are monitored and/or reported.
- Establish emergency management and response plans for Continuity of Operations Plans (COOP), a Comprehensive Emergency Management Plans (CEMP) with hazard-specific annexes and attachments, and a Disaster Response and Recovery Plan that includes members' families.

Physical Resources

- Develop a rolling, five-year plan for replacement of apparatus and other vehicles.
- Develop a rolling, five-year plan for replacement of radios and other capital tools and equipment.
- Develop a rolling, ten-year plan for replacement of stations and other facilities.
- Consider implementing closed-circuit television to reach outlying stations (Fire Chief's monthly address to personnel, other remote meetings).
- Consider adding exhaust removal systems and the ability to clean contaminated clothing in all stations as fiscal restraints allow.

Operational Programs

- Continue with current staffing models and gradually increase full-time, 24/7 coverage with combination crews of two paid personnel and two or more volunteer personnel.
- Consider guidelines and specific SOGs relating to fireground operations prior to the arrival of an effective response force (ERF) that direct whether the engine can be placed in pump and the two-person crew can make entry into the structure.

Human Resources

- Develop and implement a comprehensive annual screening process that can help identify individuals who may be at higher risk for a cardiac event on the fireground.
- Accumulate all costs related to personnel in one section of the financial reporting system including sections for administrative salaries, fire department operations salaries, part-time paid costs, volunteer stipends, overtime charges, and a detail of benefits.
- Compare employee benefits programs for similar systems and establish policy positions for leave time, workers' compensation and other insurance costs, payroll taxes (FICA/Medicare), retirement cost sharing, health, dental and life insurance costs, and other employee benefits.
- Develop an enhanced cancer prevention program that begins with policies minimizing individuals from wearing contaminated personal clothing back to work or home.

External Systems

- Develop options for auto-aid agreements, resource-sharing, or consolidation with Smith County ESD 1, the City of Whitehouse, and/or others.
- Establish automatic aid agreements with surrounding communities or follow State of Texas 12-hour mutual aid policy.
- Consider the mid-range goal of becoming a regional maintenance facility. This would result in improved maintenance services to neighboring agencies and a revenue stream to support future growth.
- During short- and mid-term planning, consider increasing personnel and regional opportunities relating to the fleet services program.

Recommended Long-Term Strategy

It is anticipated that the critical issues mentioned previously will continue to play an important role in the District's development of a long-term strategy for improvement. Some of these recommendations assume that short- to mid-term recommendations have been implemented and have provided some measure of positive results. Long-term recommendations are contingent upon anticipated population growth, changes on demographics, and the availability of funding.

Long-term Recommendations

Staffing

- Continue focused recruitment for members, both paid and volunteer, with a strong customer service motivation in a rapidly-developing, yet rural setting.
- Evaluate the feasibility of three-person paid staffing if required by diminishing number of active, trained volunteers falls below numbers needed to meet service needs and expectations.

Cherokee County Response

- Continue to monitor the cost allocation process to ensure fair and equitable reimbursement for services provided by the District to others in Cherokee County.
- Implement a funding plan that is based on a cost apportionment formula, limited to available funds, that is in accordance with State law, includes input from all interested stakeholders, and is agreeable to all officials affected by the agreement(s).

Training

- Review and update the annual training plan, needs assessment, defined annual program goals, objectives, performance measures, and monitoring processes.
- Update target hazard lists in order to prioritize the completion of a pre-plan.
- Continue the pre-fire planning program with an assigned coordinator in each station.
- Continue training programs on the pre-fire planning process and its use.

Other Recommendations

Governance and Administration

- Continue regular staff meetings, complete with minutes for all senior, company, and/or staff meetings.
- Continue member newsletters to ensure that communication is distributed throughout the system.
- Continue to explore ways to improve the efficiency and effectiveness of administrative activities within the District.

Assessment and Planning

- Update the strategic plan to ensure it continues to meet the needs for today and the future.
- Continue review at least one-third of all SOGs/Rules and Regulations each year.
- Continue and expand community involvement with advisory committees, surveys and/or meetings throughout the community.
- Continue active participation in LEPC.
- Update emergency management and response plans.

Physical Resources

- Formalize a funding strategy for all capital improvements.
- Update rolling, long-term plans for replacement of apparatus and other vehicles; radios and other capital tools and equipment; and stations and other facilities.
- Evaluate the need for additional station locations and other facilities throughout the District.
- Relocate the administration/operational support building to the Red Springs 2 station complex.
- Finalize the design and construction of a regional training facility at the Red Springs 2 station complex.
- Continue use of closed-circuit television CCTV for training, meetings, security, and other purposes.
- Continue program to adding exhaust removal systems and the ability to clean contaminated clothing in all stations as fiscal restraints allow.

Operational Programs

- Continue with current staffing models and gradually increase full-time, 24/7 coverage with combination crews of two paid personnel and two or more volunteer personnel in all 11 departments.
- Review and update guidelines and SOGs relating to fireground operations and the determination/use of an effective response force (ERF).
- Explore possibility of shared resource programs with SC-ESD 1 to improve coverage in remote, north-west corner of the District.

Human Resources

- Continue with a comprehensive annual screening process for cardiac risk.
- Continue to streamline the financial reporting system relating to personnel costs.
- Continue to compare employee benefits programs for similar systems to ensure policy positions for leave time, workers' compensation and other insurance costs, payroll taxes (FICA/Medicare), retirement cost sharing, health, dental and life insurance costs, and other employee benefits are competitive and attractive to current and potential members and staff.
- Continue with an enhanced cancer prevention program.

External Systems

- Review existing and needed auto-aid agreements, resource-sharing, and consolidation efforts.
- Continue with regional maintenance facilities and fleet services programs.

Financial Impact of Long-Term Strategies

Based on projections, current revenues are insufficient to provide funding for all ESCI recommendations. The District should consider revenue enhancements that may be available to offset a portion, if not all, of the annual deficit cash flows. Three possibilities to be considered, either individually or in concert with each other, are:

- **Option 1:** Increasing the property tax to the $0.10 maximum rate versus the current $0.084648;
- **Option 2:** Seeking and gaining approval to collect a sales and use tax of 1.5 percent in unincorporated areas and 1 percent in participating incorporated areas; and
- **Option 3:** Financing the cost of new buildings and incurring debt service versus the current pay-as-you-go strategy of full cash payment form reserve funds.

SECTION I:

EVALUATION OF CURRENT CONDITIONS

ORGANIZATION OVERVIEW

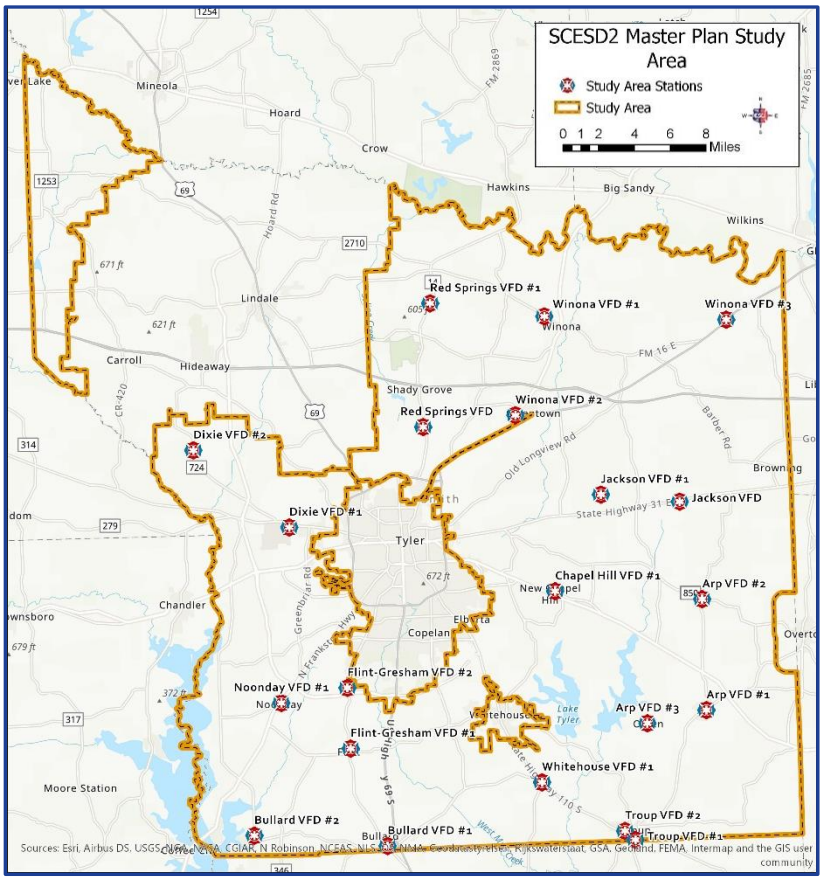
Smith County

Smith County is located in East Texas, approximately 98 miles from Dallas. The County has a long and distinguished history dating back to 1846. The addition of the railroad in the late 1800s created the famous St. Louis Southwestern Railway—the Cotton Belt Route (now part of the Union Pacific system)—and Smith County became a critical hub for transportation and commerce. Today, Smith County has a population over 230,000 residents and is home to numerous higher education institutions, with rich cultural diversity.

Service Area Population and Demographics

SC-ESD 2 has a challenging response area covering 712 square miles throughout Smith County and outside the city limits of Tyler, Texas, and smaller jurisdictions. There is a wide variety of population densities, geographic variances including large bodies of water and limited-access open-space. Jurisdictional boundaries around the City of Tyler and the City of Whitehouse limit agency response throughout the District. Limited mutual and automatic aid agreements with the above organizations results in a delayed response in specific areas.

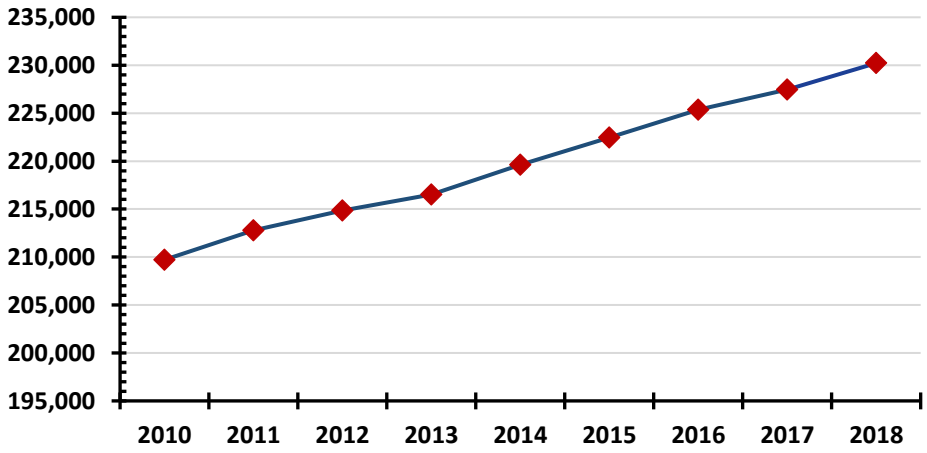
Figure 16: Smith County ESD 2 Service Area



Population

As of 2018, SC-ESD 2 serves a population of 92,726 constituents.[3] The total population in Smith County for 2018 was estimated at 230,221. Over the past 4 years, the County has seen limited growth at 1.28 percent. The City of Tyler makes up the majority of the population with 104,991 residents. The remaining population of 125,230 is found throughout the county. Over the past 25 years, the City of Tyler's population increased 28 percent, whereas population growth outside of the City of Tyler has increased by 44 percent. This trend would support the probability that there will be an increased need for emergency services throughout SC-ESD 2.[4]

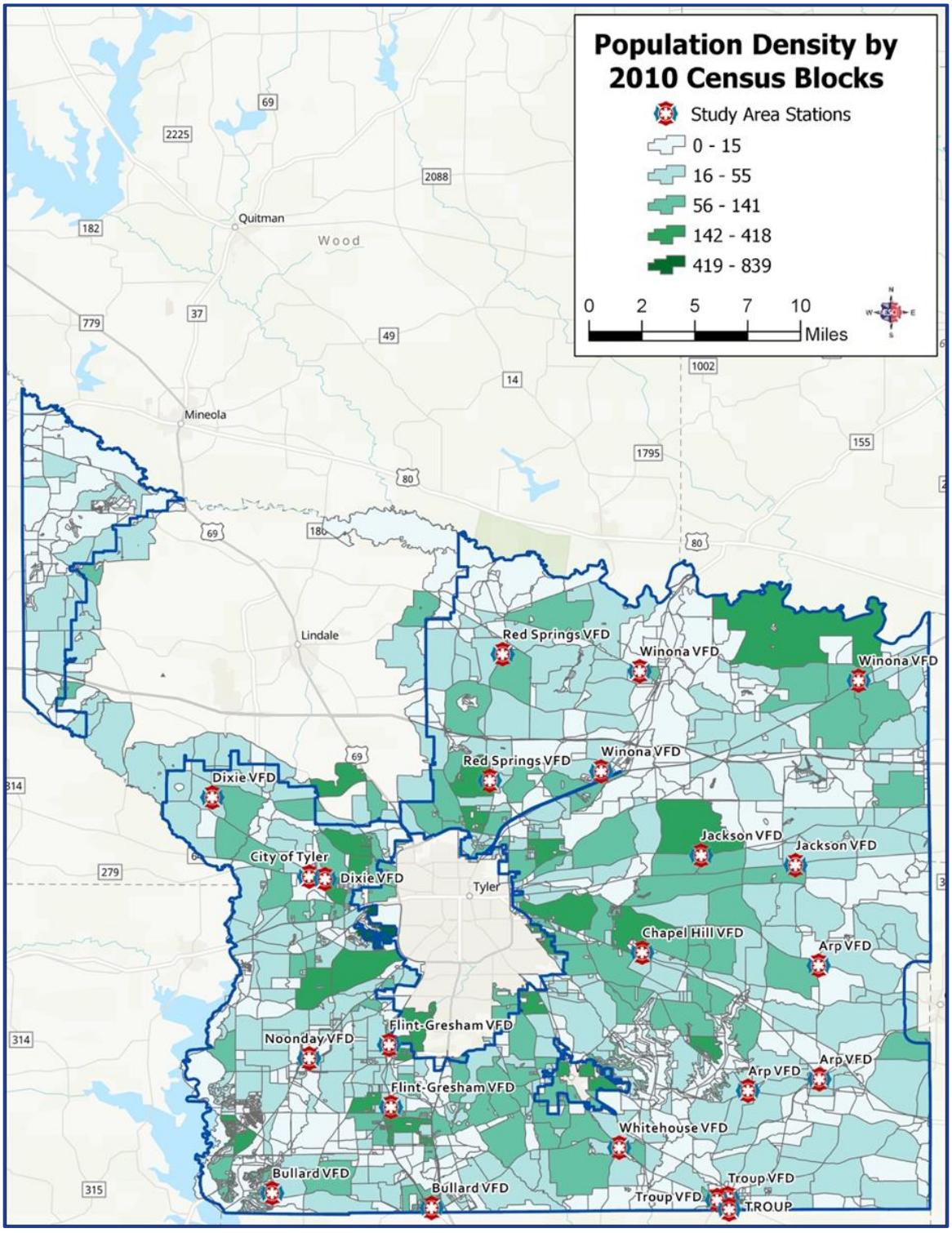
Figure 17: Population History, 2010–2018



Population Density

SC-ESD 2 has a predominantly rural population. The largest incorporated cities/towns include Arp, Bullard, and Troup, which account for approximately 6,200 residents. The remaining 86,526 residents are in the smaller municipalities and unincorporated areas. The dispersal of population over such a large area makes resource distribution a challenge. The following figure shows the current population densities throughout the District. The data supports that station locations are in alignment with higher density populations. There is one area north of the Noonday Station that may require future considerations for a new station.

Figure 18: Population Density



Foundational Policy Documents

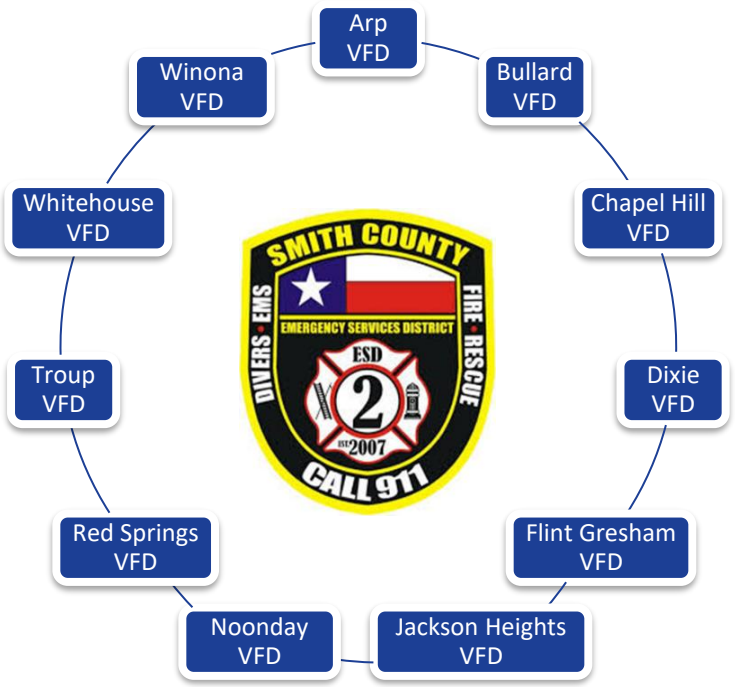
On August 28, 2006, the Smith County Commissioner's Court authorized a public election to consider the formation of Smith County Emergency Services District 2 (SC-ESD 2). After the vote in favor of forming the special district, the Smith County Commissioner's Court adopted an Order creating SC-ESD 2 on November 7, 2006. Except for the following jurisdictions, all of Smith County was included in the order:

- Smith County ESD 1 (Lindale and surrounding area)
- City of Tyler
- City of Hideaway
- City of Whitehouse

Organizational Design and Current Service Delivery

SC-ESD 2 is an Emergency Services District under Chapter 775 of the Texas Health and Safety Code. The District provides all-hazard emergency response services to the majority of unincorporated areas in Smith County, Texas. Service is provided by SC-ESD 2 personnel and 11 service providers operating under service contract to the District. Each service provider is a 501(c) volunteer fire department.

Figure 19: SC-ESD 2 Organization



The District also has interlocal agreements for additional contract services with two additional departments—Van VFD and Mineola VFD—for services in the northwest corner of the District.

Collectively, the SC-ESD 2 system provides a variety of services including fire suppression, emergency medical services (first responder, non-transport), technical rescue, water rescue, and hazardous materials response. Support services include public education, fleet and facility maintenance, member training, and administrative support services. The District has an established and well-equipped wildland interface team, capable of providing local and regional response to wildland fires. The District also has the capability to provide regional incident support services for major events including stand-alone emergency communications, a mobile fleet maintenance resource, and an incident command structure.

Smith County has a contract with UT Health to provide advanced life support (ALS) pre-hospital care throughout the county. Based on defined criteria and emergency medical dispatching (EMD), SC-ESD 2 provides BLS support for specific medical emergencies. Also, SC-ESD 2 has interlocal agreements with neighboring agencies for mutual aid and automatic aid, including additional hazardous materials response the City of Tyler. Fire prevention, fire and life safety inspection, fire investigation, and emergency management services are provided by Smith County. These combined resources translate to a remarkable response capability throughout the District.

Governance and Lines of Authority

SC-ESD 2 is a combination system comprised of District personnel, with both full-time and part-time employees, and volunteers associated with one of 11, independent service providers. The District Fire Chief is the administrative head of the system and serves under the general supervision and direction of the SC-ESD 2 District Board of Commissioners. The District has 41 approved positions—seven administrative staff positions and 34 operations positions (24 full-time and 10 part-time), including four supervisors. Part-time positions are filled from a pool of 74 part-time employees.

Each of the 11 service providers are volunteer fire departments with a Board of Directors, volunteer Chief, members, and independent rank structure. Although there has been some discussion about pursuing a single ISO PPC® classification for the entire District, each department maintains a separate ISO public protection classification (PPC®) for all properties located within the department service area. Collectively, the 11 departments of SC-ESD 2 have about 290 volunteers.

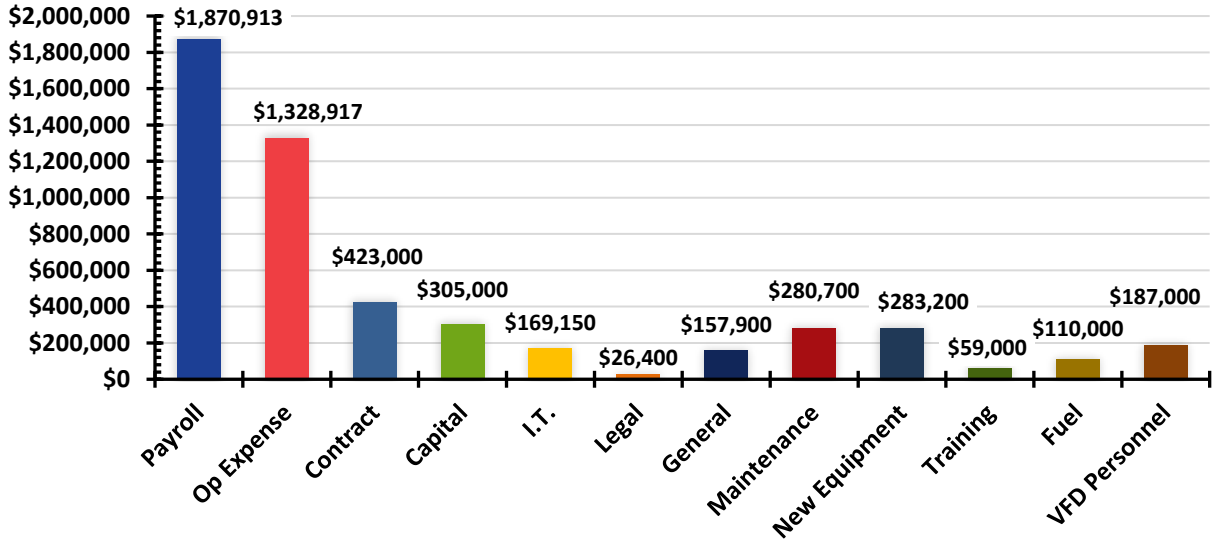
However, this number is somewhat misleading in that only 54 members (18 percent of all volunteers on department rosters) are certified by SFFMA or TCFP as structural firefighters and make more than 10 percent of their respective department's calls.[5] This underscores the need for a combination system; that is, a system that includes both paid District personnel and department volunteers to ensure an adequate initial response with a sufficient number of personnel to perform critical tasks. The goal of the District is to provide round-the-clock staffing with two paid personnel on duty to supplement volunteer personnel at each of the 11 departments. Given the current available funding, round-the-clock staffing is not possible at this time. Also, many stations do not have adequate dorm accommodations for round-the-clock staff.

Additional staffing details and a copy of the current organizational chart is located in the Staffing section of this report.

Operating Budget, Funding, Fees, Taxation, and Financial Resources

Following the creation of SC-ESD 2, budget transfers and budget amendments were placed under the new organization. The District is funded through a property tax rate not to exceed $0.10 per $100.00 assessed value. The adopted general fund budget for FY 2018 was $5,201,820. The next figure shows a breakdown of the current budget.

Figure 20: Department Budget Summary



Financial Analysis

Historical Revenue and Expense

A critical component of the success and operation of any business, private or public, is a consistent and reliable funding stream. In the instance of public agencies, this funding is usually provided by the assessment and collection of various forms of taxation such as ad valorem (real estate) taxes, sales taxes, special assessments and billings for services. Recognizing the limits of public funding, public safety agencies, including emergency services districts, are limited in the level of service they may provide to their communities by the types and levels of revenues that the authority having jurisdiction is willing, or limited by the legislative process, to assess. Public agencies also may charge fees for services under contractual arrangements or interlocal agreements to other agencies or areas outside of their political boundaries.

SC-ESD 2 contracts and coordinates with 11 volunteer fire departments to provide services throughout Smith County. The District provides funding to these agencies to allow them to supplement their volunteer service delivery systems with full-time and part-time paid firefighters. The 11 departments operate from a combined total of 21 fire stations.

SC-ESD 2 operates on a fiscal year beginning October 1 and ending on September 30. The District is the funding source for fire protection services and the overall coordination of providing those services through 11 volunteer fire departments throughout the majority of Smith County. The District was formed in 2007 under Section 775 of the Texas Health and Safety Code. A tax rate, to a maximum of $0.10 per one hundred dollars of taxable property value, is set annually pursuant to Section 775.074 of the enabling legislation. The District's current tax rate is $0.084648 per one hundred dollars of taxable property value.

As SC-ESD 2 is the funding source with an overarching responsibility to provide the service, it is more prudent to evaluate the financial resources and expenditures of SC-ESD 2 rather than to attempt to evaluate the financial strength of each of the 11 volunteer fire departments operating within the system. The Board of Commissioners and Fire Chief have provided direction in an effort to standardize the operations of the 11 departments. This includes acquiring similar equipment, supplies, and services. The ability of the SC-ESD 2 to acquire larger quantities of equipment and bulk quantities of supplies produces savings to the system.

The accounting system separates the District's fire operations and administrative costs from the District-supported individual fire department operating costs. Budget information received from Finance Director Denna Mangold provided a reasonable level of detail in most instances but did summarize employee compensation to a level that minimized the analytical value of that category. ESCI relied on the annual audit reports and attempted to minimize the impact of certain Governmental Accounting Standards Board (GASB) required adjusting entries for pension and other post-employment benefit cost calculations. Cash balance information carried forward from the 2015 report matches the cash balances in the subsequent audit reports.

Full-time and part-time firefighters have been employed by the various agencies for several years. Prior to 2016, these employees were hired and paid by the individual agencies and were under the supervision of the respective agencies' fire chiefs. Beginning in 2016, SC-ESD 2 transitioned into the role of administrative and operational manager and assumed responsibility for all employees, operational and administrative. The District funds the costs of payroll taxes, health insurance, and workers' compensation insurance for employees but prior to the fiscal 2019 budget, health insurance costs were included in the insurance cost category. Workers' compensation insurance remains included in the insurance category. Prior to the fiscal year 2019 budget, payroll taxes appear to have been included in the compensation category. Additionally, beginning in fiscal 2019, an employee pension plan has been implemented.

Revenue

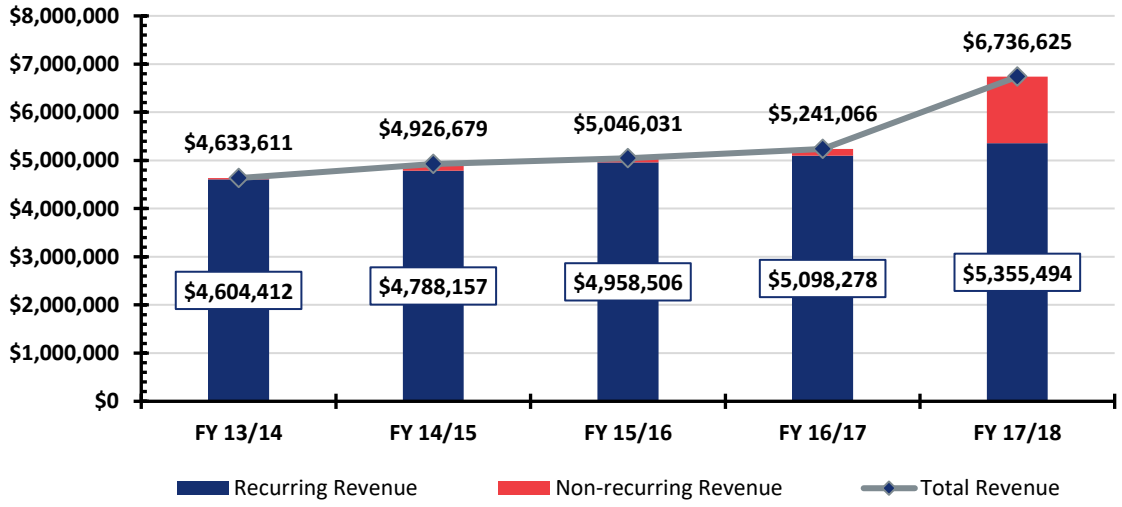
Property taxes are the District's most significant source of recurring revenue. Emergency Services Districts in Texas are limited to a maximum tax rate of $0.10 per one hundred dollars of assessed value. The District has experienced an average growth in valuation of approximately 3 percent over the past five years. The District's tax rate has remained at $0.84648 during the five-year evaluation period. Additional recurring revenues in the form of service fees from Cherokee County and the East Texas Medical Center EMS contract are noted. Non-recurring revenues include grants, sales of surplus property, interest, loan proceeds, and revenues from other miscellaneous sources. The following figure displays recurring and non-recurring revenues of the District to be used to pay its operating expenses, capital expenditures, and debt service from fiscal 2014 to 2018.

Figure 21: Smith County ESD 2 Financial Resources, FY 13/14–FY 17/18

Property Taxes	Actual				
	FY 13/14	FY 14/15	FY 15/16	FY 16/17	FY 17/18
Valuation	$5,329,661,963	$5,504,783,771	$5,702,720,309	$5,876,153,929	$6,153,078,787
Tax rate per hundred	$0.084648	$0.084648	$0.084648	$0.084648	$0.084648
Assessed amount	4,511,316	4,653,912	4,831,332	4,983,765	5,207,811
Current collections	$4,453,302	$4,632,143	$4,795,493	$4,952,665	$5,196,104
Delinquent taxes	98,244	102,398	109,397	100,997	114,774
Total property tax	4,551,546	4,734,541	4,904,890	5,053,662	5,310,878
Cherokee Co Funds	44,616	44,616	44,616	44,616	44,616
ETMC EMS Contract	8,250	9,000	9,000	-	-
Recurring revenue	**4,604,412**	**4,788,157**	**4,958,506**	**5,098,278**	**5,355,494**
Other income	21,960	95,215	36,614	75,158	194,201
Insurance proceeds	-	1,044	-	-	-
Training income	-	-	5,936	-	-
Grant	-	34,970	37,622	60,155	50,077
Interest	7,239	7,293	7,353	7,475	6,303
Loan proceeds	-	-	-	-	1,105,500
Sale of property	-	-	-	-	25,050
Non-recurring rev	**29,199**	**138,522**	**87,525**	**142,788**	**1,381,131**
Total revenue	**$4,633,611**	**$4,926,679**	**$5,046,031**	**$5,241,066**	**$6,736,625**

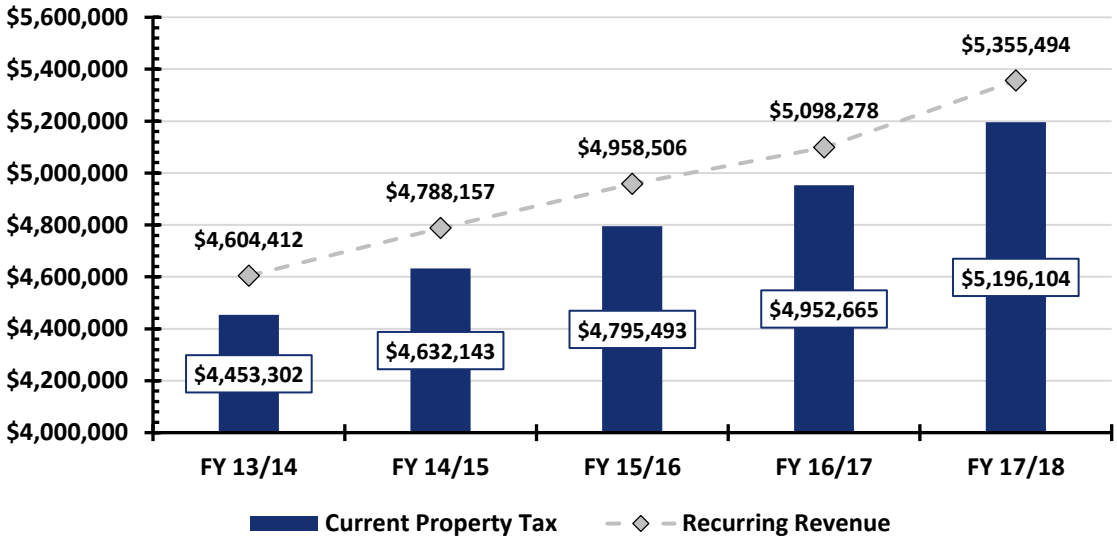
The following figure indicates the two major classes of resources available to the District to provide for operational expenses, capital expenses, and debt service. Recurring revenue, indicated in blue, has grown from $4,604,412 in FY 13/14, to $5,355,494 in FY 17/18, an increase of approximately 16.3 percent over the five-year period. Non-recurring revenue is a highly variable source of funding as shown by the impact of the loan proceeds received in FY 17/18.

Figure 22: Smith County ESD 2 Recurring Versus Non-Recurring Revenues, FY 13/14–FY 17/18



As previously noted, property tax values have increased approximately 3 percent during the evaluation period providing steady but moderate growth to property tax and, correspondingly, recurring revenue. Of significance to non-recurring revenue was a new loan obtained by the District in FY 17/18.

Figure 23: Smith County ESD 2 Current Tax Revenues Versus Total Recurring Revenue, FY 13/14–FY 17/18



In summary:

- The most significant source of revenue to the recurring revenue component is the assessment and collection of property taxes. The District budgets for a collection rate of 97 percent but has typically collected current assessed property taxes in excess of 99 percent annually.
- Property tax revenues, including collections of prior year's taxes and penalties and interest thereon, average 98 percent of total revenue from FY 13/14 to FY 16/17. The anomaly occurs in FY 17/18 as a result of the loan proceeds.
- The total sources of funding to the District have increased from $4,633,611 in FY 13/14, to $5,241,066 in FY 16/17, an increase of 13.1 percent in four years.
- The District provides first responder services through its departments to Cherokee County under a service agreement. The annual amount of $44,616 has remained unchanged during the last five years.
- The District had entered into a lease agreement with East Texas Medical Center for bay and housing space for an ambulance crew in the Troup VFD fire station. The lease ended in FY 15/16. Prior to its expiration, the agreement generated approximately $9,000 of revenue annually.
- The District has received grant funding of $34,970, $37,622, $60,155, and $50,077 from the State of Texas in FY 14/15, FY 15/16, FY 17/17, and FY 17/18 respectively.
- Miscellaneous receipts have varied dramatically throughout the evaluation period ranging from a low of $21,960 in FY 13/14, to a high of $194,201 in FY 17/18.

Expenditures

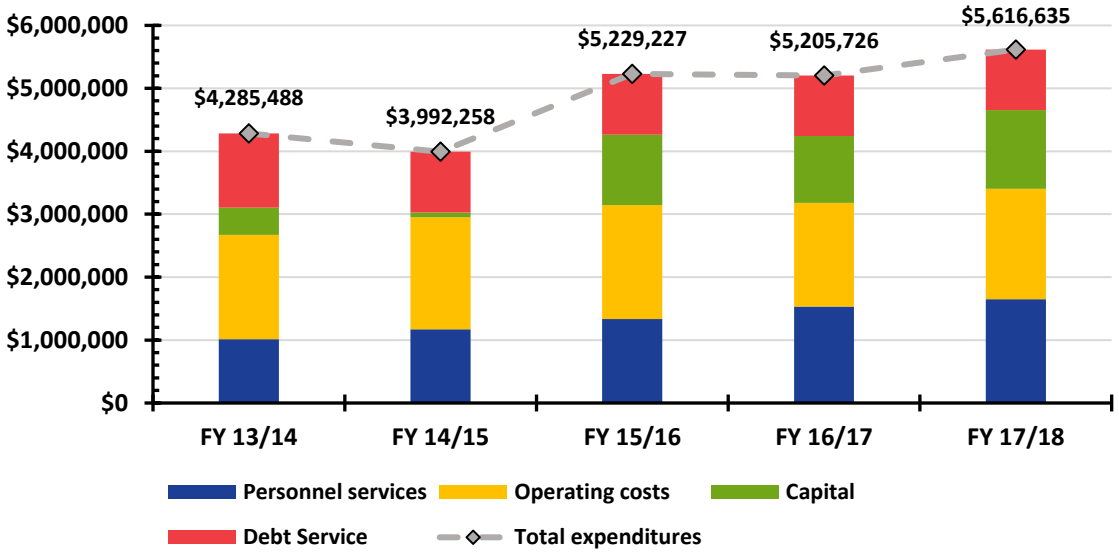
The following figure indicates actual expenditures of the District for FY 13/14 through FY 17/18. Salaries and Wages includes payments to full-time, part-time, volunteer chief and firefighter stipends, pay-per-call staff, and administrative staff. Prior to FY 17/18, employee insurance costs were included in the District's budget for property and liability insurance. Beginning in FY 17/18, the District began accounting for these costs within the employee cost benefits category. Operating expenditures are separated between administrative costs and fire department operational costs as provided for in the District's budgeting process. Capital expenditures for the purchase of land, building construction or improvement, apparatus purchases, or equipment replacement are recognized as non-recurring expenditures. Likewise, debt service is recognized separately and included as a non-recurring expenditure.

Figure 24: Smith County ESD 2 Expenditures, FY 13/14–FY 17/18

Expenditures	Actual Expenditures				
	FY 13/14	FY 14/15	FY 15/16	FY 16/17	FY 17/18
Salaries/wages	$1,163,956	$1,324,562	$1,517,042	$1,639,352	$1,808,175
Benefits	8,171	9,190	14,907	9,786	81,393
Personnel services	1,172,127	1,333,752	1,531,949	1,649,138	1,889,568
Administrative expenses	656,564	689,710	958,969	1,002,823	737,301
Operations expenses	1,124,385	1,115,232	603,184	699,146	1,079,868
Contingency	-	6,901	86,165	51,381	1,842
Total recurring expenses	2,953,076	3,145,595	3,180,267	3,402,488	3,708,579
Principal	892,993	906,804	923,126	939,742	954,435
Interest	71,189	58,276	41,417	24,590	23,637
Debt service	964,182	965,080	964,543	964,332	978,072
Land	-	-	23,508	46,840	-
Building improvements	-	-	-	983,012	1,131,717
Apparatus	75,000	988,778	593,461	72,370	416,771
Other equipment	-	129,774	443,947	147,593	718,617
Capital	75,000	1,118,552	1,060,916	1,249,815	2,267,105
Total non-recurring expenditures	1,039,182	2,083,632	2,025,459	2,214,147	3,245,177
Total expenditures	**$3,992,258**	**$5,229,227**	**$5,205,726**	**$5,616,635**	**$6,953,756**

The sections in the previous figure are presented in a manner consistent with governmental fund accounting and allow the Board to understand the impact of each of the categories on the organization's finances. The following figure shows these major categories and their share of total District expenditures for FY 13/14 through FY 17/18.

Figure 25: Smith County ESD 2 Expenditures by Major Category, FY 13/14–FY 17/18



Prior to FY 17/18, personnel costs include full-time, part-time, administrative, and volunteer stipends, but do not appear to include benefit costs as employee insurance costs were budgeted with the District's liability and property insurance. Prior to FY 18/19, the current adopted budget, the District did not offer pension benefits. Personnel costs have increased annually from $1,172,127 in FY 13/14, to $1,889,658 in FY 17/18, a 61.2 percent increase during the five-year period. Personnel costs, as compared to recurring costs, have risen from 39.7 percent in FY 13/14, to 50.9 percent in FY 17/18. In comparison, career-based fire departments usually spend in excess of 90 percent of their recurring expenditures on personnel-related costs.

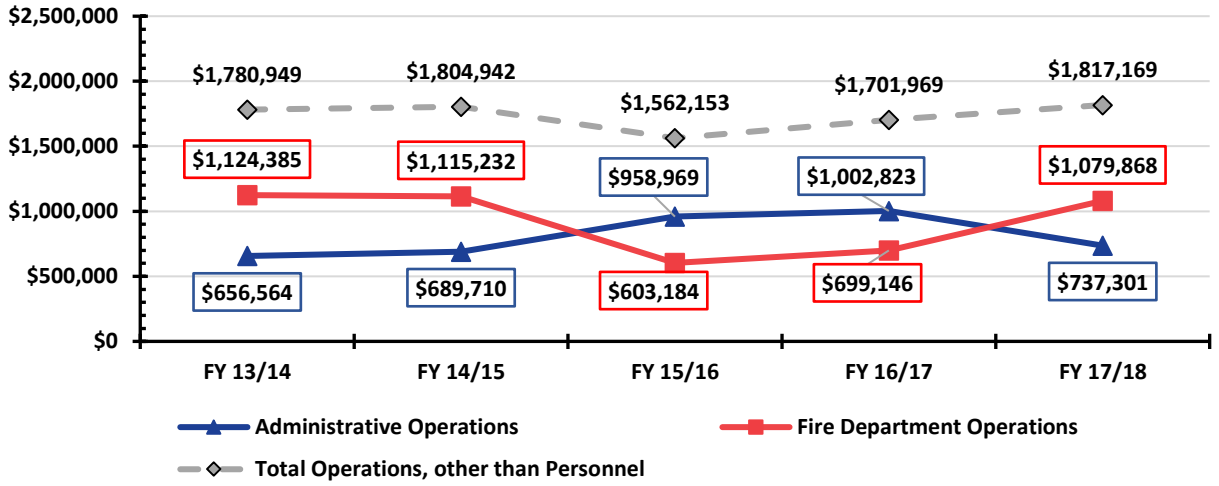
With the District offering health insurance benefits to its employees, it is critical that a member of the administration review the monthly or quarterly performance report. Insurance costs have increased significantly during the five-year period; however, the cause is difficult to identify as insurance costs have contained employee related insurance costs such as workers' compensation. Insurance costs decreased from $200,039 in FY 16/17 to $152,283 in FY 17/18. Incentives may be considered to encourage healthy lifestyles which may have a positive impact on the health insurance program.

The District implemented a retirement pension plan in FY 18/19. The plan is through the Texas County and District Retirement System (TCDRS). Key elements of the plan are:

- A percentage of each paycheck (up to 4 percent) is deposited into the employee's TCDRS account. The employee's savings grow at an annual, compounded rate of 7 percent interest.
- The District matches employee contributions "dollar for dollar" up to 4 percent.
- At retirement, the employee receives benefit payments for life based on final account balance and employer matching.

The District accounts for its operating expenses using two categories; the administrative department and the fire department operations department. The combined costs of operating the District, without regard to personnel, capital, or debt service items has shown moderate growth during the five-year period. The following figure shows the relationship between the two categories.

Figure 26: Smith County ESD 2 Administrative and Fire Department Operating Costs, FY 13/14–FY 17/18



Service Area Variances

In addition to the funding provided to District departments, SC-ESD 2 has also compensated departments outside the District—Van, Mineola, and Gladewater VFD—that provide services to District areas that are not readily accessible to the District's contract service providers. Overall, the cost of these services has totaled $45,000 per year over the past several years. With the opening of Winona Station 3 in 2017, the District discontinued payments to Gladewater VFD.

The City of Whitehouse elected to create its own fire department and to not participate in the District's service delivery plans except for structure fire type incidents. The District re-formed the Whitehouse VFD to provide services to areas outside the city limits of Whitehouse. The Whitehouse VFD Station is located south of the City of Whitehouse, so responding units must pass through the city when providing services to areas north of the city. This has created a service delivery issue in those areas due to extended travel times and distance.

The District has been prudent in the use of debt to fund capital expenditures and is anticipated to be debt free based on information contained in the draft of the FY17/18 audit report. As examples, the District has:

- Acquired land and completed construction of some new facilities as well as renovated others;
- Completed the construction of a station building in Chapel Hill through a joint effort and defined by Interlocal Agreement;
- Planned for the replacement of Flint-Gresham Station 1 and Arp Station 1; and
- Developed an apparatus replacement schedule with the intent to sustain a safe, modern, and cost-efficient fleet of emergency apparatus, other vehicles, and support equipment.

Net Operating Cash Flow (Deficit)

A critical aspect of the success of any entity, public or private, is the ability to provide for the recurring expenses with a reliable recurring income stream. A positive operating cash flow allows an entity to better plan for future service delivery enhancements. The following figure shows the comparison of recurring revenues versus recurring expenses.

Figure 27: Smith County ESD 2 Comparison of Recurring Revenue to Recurring Expense, FY 13/14–FY 17/18

Description	Actual				
	FY 13/14	FY 14/15	FY 15/16	FY 16/17	FY 17/18
Recurring income	$4,604,412	$4,788,157	$4,958,506	$5,098,278	$5,355,494
Recurring expense	2,953,076	3,145,595	3,180,267	3,402,488	3,708,579
Operating cash flow	**$1,651,336**	**$1,642,562**	**$1,778,239**	**$1,695,790**	**$1,646,915**

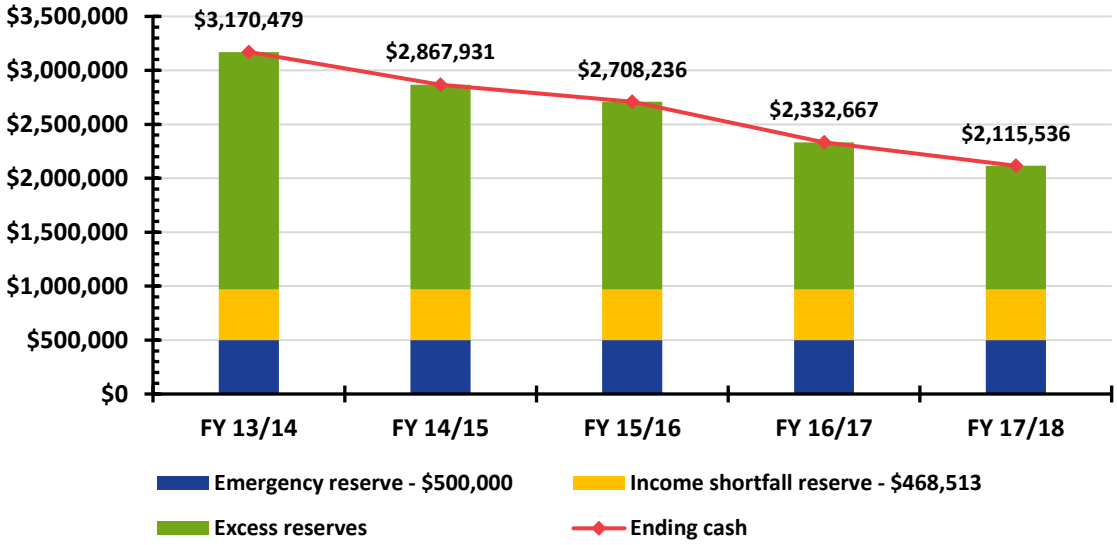
Similarly, an entity, but more importantly, a public agency must maintain a cash reserve. The District's Board of Commissioners instituted such a fund, termed a stabilization fund, by resolution. The amount was initially set at $500,000 in 2013 and increased to $968,513 in 2014. The reserve is split between a $500,000 Budget Reserve for emergencies and a $468,513 Budget Reserve for income shortfall, respectively.

Best practices identified by the State Association of Emergency Services Districts (SAFE-D) recommends that a district "budget for a contingency or reserve fund." The SAFE-D handbook further recommends that a district maintain a reserve of "10 percent of its annual budget, although most auditors will recommend, and lenders will desire a reserve of 3–6 months of operating expense." Current Board policy exceeds the SAFE-D 10 percent recommendation. The following figure compares total receipts to total expenditures and the increase or decrease in the total fund balance.

Figure 28: Smith County ESD 2 Actual Annual Cash Flows and Fund Balance Analysis, FY 13/14–FY 17/18

Description	Actual				
	FY 13/14	FY 14/15	FY 15/16	FY 16/17	FY 17/18
Total receipts	4,633,611	4,926,679	5,046,031	5,241,066	6,736,625
Total expenditures	3,992,258	5,229,227	5,205,726	5,616,635	6,953,756
Net cash flow (deficit)	641,353	(302,548)	(159,695)	(375,569)	(217,131)
Beginning cash balance	2,529,126	3,170,479	2,867,931	2,708,236	2,332,667
Ending cash balance	3,170,479	2,867,931	2,708,236	2,332,667	2,115,536
Emergency reserves	500,000	500,000	500,000	500,000	500,000
Income shortfall reserve	468,513	468,513	468,513	468,513	468,513
Excess reserves	**$2,201,966**	**$1,899,418**	**$1,739,723**	**$1,364,154**	**$1,147,023**
Fund balance (decrease)	**25.4%**	**(9.5%)**	**(5.6%)**	**(13.8%)**	**(9.3%)**

Figure 29: Smith County ESD 2 Fund Balance and Reserve Policy, FY 13/14–FY 17/18



As indicated in the previous figure, total cash reserves have declined from $3,170,479 at the end of FY 13/14 to $2,115,536, or 33.3 percent, at the end of FY 17/18. That said, the reserve balance at the end of FY 17/18 is still extremely healthy given the FY 18/19 annual budget of $5,707,007. The District is cautioned to monitor the rate of drawing down excess cash reserves in consideration of future capital and staffing plans.

Recommendations:

ESCI recommends that the District:

- Accumulate all costs related to personnel in one section of its financial reporting system including sections for administrative salaries, fire department operations salaries, part-time paid costs, volunteer stipends, overtime charges, and benefits. Personnel related expenditures will become the District's most significant expenditure and the ability to better evaluate and analyze those costs is important to making informed decisions regarding future expansion of the service delivery system. Employee benefits should include workers' compensation insurance costs, payroll taxes (FICA/Medicare), retirement cost sharing, health, dental and life insurance costs.
- Continue to explore and pursue consolidation of all administrative activities into the District's responsibilities to eliminate as much replication and duplication of efforts as possible.
- Formalize a funding strategy for the apparatus replacement program.
- Formalize a funding strategy for the construction of new fire stations and the renovation/expansion of existing facilities.
- Monitor cash flow and the draw-down rate for excess cash reserves in consideration of future capital and staffing plans.

Financial Projections

The District has experienced a steady but moderate escalation in its property values during the previous four years. For projection purposes, property values are anticipated to grow at four percent annually. The following figure utilizes the certified taxable values and the tax rate of $0.084648 per one hundred dollars of valuation for the FY 18/19 adopted budget as the starting point for five years of revenue projections.

Figure 30: Smith County ESD 2 Projected Property Tax Revenue, Adopted Budget FY 18/19–FY 23/24

Description	Adopted	Projected				
	FY 18/19 Budget	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24
Property tax						
Valuation	6,496,100,091	6,755,944,095	7,026,181,858	7,307,229,133	7,599,518,298	7,903,499,030
Tax Rate per $100	$0.084648	$0.084648	$0.084648	$0.084648	$0.084648	$0.084648
Property taxes assessed	5,498,819	5,718,772	5,947,522	6,185,423	6,432,840	6,690,154
Property taxes collected						
Collection rate	97.00%	97.00%	97.00%	97.00%	97.00%	97.00%
Current tax year	5,333,854	5,547,208	5,769,097	5,999,861	6,239,855	6,489,449
Prior tax years, penalties & interest	100,000	125,000	125,000	125,000	125,000	125,000
Total property taxes	**$5,433,854**	**$5,672,208**	**$5,894,097**	**$6,124,861**	**$6,364,855**	**$6,614,449**

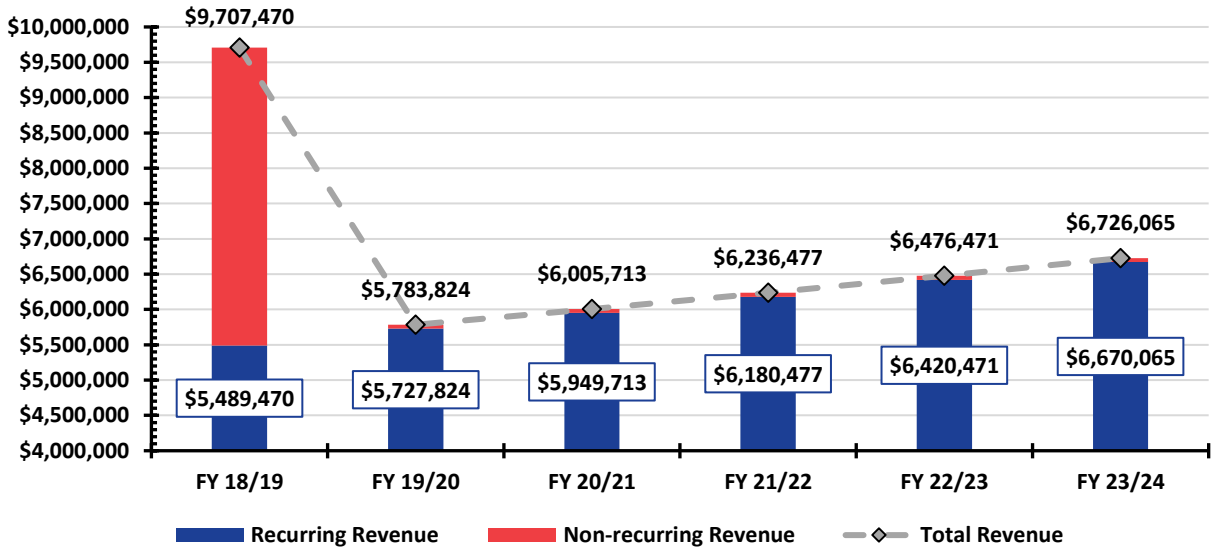
The District anticipates that it will continue to provide emergency services to portions of Cherokee County that lie outside of the boundaries of Smith County ESD 2. Similarly, the District will continue to provide other services for fees. The following figure combines projected property tax revenues with service billings to arrive at projected recurring revenues.

Figure 31: Smith County ESD 2 Projected Recurring Revenues, Adopted Budget, FY 18/19–FY 23/24

Description	Adopted	Projected				
	FY 18/19 Budget	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24
Total property taxes	5,433,854	5,672,208	5,894,097	6,124,861	6,364,855	6,614,449
Cherokee Co funds	44,616	44,616	44,616	44,616	44,616	44,616
Service billings	11,000	11,000	11,000	11,000	11,000	11,000
Recurring revenue	**$5,489,470**	**$5,727,824**	**$5,949,713**	**$6,180,477**	**$6,420,471**	**$6,670,065**

Nonrecurring revenue, a source typically difficult to predict, is projected at $50,000 for other receipts and an additional $6,000 per year for interest income on invested funds. The large anomaly in FY 18/19 results from loans obtained to construct two fire stations.

Figure 32: Smith County ESD 2 Projected Recurring vs Non-Recurring Revenues, Adopted FY 18/19–FY 23/24



Projected expenditures are based on data presented in the Staffing and the Capital Assets and Capital Improvement Programs sections. Annual expenditures are expected to increase as planned additional full-time firefighter positions are hired. As an example, the District has completed the implementation of a plan (announced in March 2019) to add two, 24-hour shift career firefighter positions at Red Springs VFD Station 2. This will have the effect of modifying the current adopted FY 18/19 budget.

In August 2020, following the scheduled completion of station construction and remodel projects, two additional stations will be increased to 24-hour full-time staffing with two firefighters each, and one additional station will be staffed on a 9-hour per day basis. This schedule is subject to change based on need and availability of funding.

Operating expenses for supplies and services, using the adopted FY 18/19 budget as a starting point, are projected to increase at three percent a year during the five-year projection period.

Capital expenditures for the construction of Arp Station 1 and Flint-Gresham Station 1, both slated for completion in August 2020, are estimated at $2,000,000 for each station. These costs are projected to be divided between FY 18/19 and FY 19/20 in an amount of $1,500,000 and $2,250,000 respectively. Debt service on the loans for the fire stations is calculated using one annual payment with an interest rate of 3.75 percent or $487,045 each year. Similarly, the District has developed and is in the process of executing an apparatus replacement schedule. The District's various volunteer fire departments are still operating front-line apparatus that are perceived to have exceeded their operating life expectancy. For projection purposes, it is anticipated that an engine will be replaced in each of the first, second, fourth, and fifth years and a ladder truck will be replaced in the third year of the projection period.

The following figure shows projected expenditures for the revised FY 18/19 budget through FY 23/24.

Figure 33: Smith County ESD 2 Projected Expenditures, Modified Budget, FY 18/19–FY 23/24

Expenditures	Revised	Projected				
	FY 18/19 Budget	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24
Salaries/wages	1,983,058	2,147,025	2,268,736	2,336,798	2,406,902	2,479,109
Benefits	285,000	338,658	366,620	380,119	394,148	408,728
Total salaries and wages	2,268,058	2,485,683	2,635,356	2,716,917	2,801,049	2,887,837
Administrative expenses	968,550	997,607	1,027,535	1,058,361	1,090,112	1,122,815
Operations expenses	1,147,700	1,182,131	1,217,595	1,254,123	1,291,746	1,330,499
Contingency	40,000	-	-	-	-	-
Total recurring expenses	**4,424,308**	**4,665,421**	**4,880,486**	**5,029,400**	**5,182,907**	**5,341,151**
Principal	1,105,500	337,045	349,684	362,798	376,403	390,518
Interest	20,000	150,000	137,361	124,247	110,642	96,527
Debt service	1,125,500	487,045	487,045	487,045	487,045	487,045
Land	-	-	-	-	-	-
Buildings	1,500,000	2,500,000	-	-	-	-
Apparatus	-	500,000	500,000	1,500,000	500,000	500,000
Other equipment	203,000	-	-	-	-	-
Total Capital	1,703,000	3,000,000	500,000	1,500,000	500,000	500,000
Total non-recurring expenditures	**2,828,500**	**3,487,045**	**987,045**	**1,987,045**	**987,045**	**987,045**
Total expenditures	**7,252,808**	**8,152,466**	**5,867,531**	**7,016,445**	**6,169,952**	**6,328,196**

Understanding the net cash flow available from the operations of the district is critical to developing plans for the future service delivery system of the District.

Figure 34: Smith County ESD 2 Projected Cash Flow from Operations Budget, FY 18/19–FY 23/24

Description	Revised	Projected				
	FY 18/19 Budget	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24
Recurring revenues	5,489,470	5,727,824	5,949,713	6,180,477	6,420,471	6,670,065
Non-recurring revenues	4,218,000	56,000	56,000	56,000	56,000	56,000
Total revenues	**9,707,470**	**5,783,824**	**6,005,713**	**6,236,477**	**6,476,471**	**6,726,065**
Recurring expenditures	4,424,308	4,665,421	4,880,486	5,029,400	5,182,907	5,341,151
Non-recurring expenditures	2,828,500	3,487,045	987,045	1,987,045	987,045	987,045
Total expenditures	**7,252,808**	**8,152,466**	**5,867,531**	**7,016,445**	**6,169,952**	**6,328,196**
Increase (Decrease) in Cash	2,454,662	(2,368,642)	137,642	(779,968)	306,519	397,869
Beginning Cash	2,115,536	4,570,198	2,201,556	2,339,198	1,559,230	1,865,749
Ending Cash	**4,570,198**	**2,201,556**	**2,339,198**	**1,559,230**	**1,865,749**	**2,263,618**

As indicated in Figure 34, cash flow from operations utilizing the stated assumptions remains positive with the exception of the second year in which the two stations are completed (FY 19/20). The cash balance remains above the desired budget reserves of $968,513 in each of the years through FY 23/24.

MANAGEMENT COMPONENTS

Effective department management is a complicated and increasing challenge for service leaders. With increasing complexity comes increased cost. Today's department must address management complexities that include an effective organizational structure, setting and measuring levels of service, staying abreast of new technologies and methods, evaluation and maintenance of a qualified workforce, staff development for effective succession, and financial sustainability for the future.

Mission, Vision, Strategic Planning, Goals and Objectives

SC-ESD 2 established statements of its organizational mission, vision, and core values. Doing so establishes the foundation upon which the organization provides services to its community.

SC-ESD 2's Mission Statement is:

The Mission of SC-ESD 2 is to be the leading emergency service district by meeting the needs of our community in fire prevention, fire suppression, rescue operations, and emergency medical response in the most effective manner possible.

SC-ESD 2's Vision Statement is:

The Vision of SC-ESD 2 is to utilize and improve the skills and dedication of our staff and volunteers and to constantly improve operations and services for the citizens of Smith County.

Establishing values and associated statements embraced by all members of an organization is extremely important. They recognize those features and considerations that make up the personality of the organization.

SC-ESD 2's Organizational Values are:

- Provide a safe, healthful, and environmentally responsible emergency response system.
- Promote teamwork and support staff with adequate resources to attain superior performance.
- Meet and/or exceed local, state, and federal emergency service agency standards.
- Use a progressive operational model to facilitate superior service levels and administrative controls within available resources.
- Actively recruit the best-qualified persons without regard to race, color, or creed.
- Provide proactive and open communications within the organization, the community, and related organizations.

Foundational Management Components

To be effective, the management of a department needs to be based on a number of components. SC-ESD 2 has a mission and vision statement. The mission and vision statements are displayed on the District's website (http://smithcountyfire.org/Mission.aspx) and have been communicated to the members of the department. ESCI notes that the statements need to be reviewed by the whole department to evaluate if the mission, vision, and established values meet today's emergency services needs and/or if they address the needs for the future.

From these fundamental elements, SC-ESD 2 should consider evaluating the environment it operates within, and establish a series of strategic initiatives, goals, and objectives. These elements combine to form a strategic plan.

A strategic plan typically has the following elements:

- Internal and external environmental scan (SWOT analysis).
- Mission, Vision, and Values (or Guiding Principles).
- Initiatives, goals, and subordinate objectives within performance metrics or outcome statements.
- Timelines assigned to each objective.
- The manager assigned to each initiative.
- Responsible persons assigned to coordinate the achievement of each objective.

The strategic plan establishes timelines for the goals and objectives to be accomplished and assigns them to appropriate personnel to complete. In compiling a strategic plan, the goals and objectives are aligned as prioritized workflow, timelines ensure that they stay on track, and the personnel assigned to achieve them are accountable for keeping the work product moving forward. The work is consistent with the mission, propels the agency toward its vision, and the values reinforce how personnel treats each other (culture) in the process of achieving the strategic plan.

SC-ESD 2 currently does not have any agency goals or objectives that have been established, nor a code of ethics/code of conduct policy. SC-ESD 2 should conduct a full-fledged strategic plan for three-to-five years, depending upon the scope of the work involved, and should be approved and adopted by the District Commissioners, which then sanctions the work to be performed in implementing the plan. All non-emergency work that does not align with the strategic plan should be evaluated for its importance since work not reflected in the strategic plan robs energy away from accomplishing the strategic plan.

A capital facilities plan should be a 10-year plan in which it is periodically reviewed and has specific projects identified in it. Currently, there is no funding set-aside for a facilities plan. Additionally, SC-ESD 2 has an apparatus/equipment plan. The apparatus/equipment plan is an as-needed plan but averages two replacement apparatus per year.

Regulatory, Policy, and Guidance Documents

Consistent with other fire and EMS services nationally and even globally, SC-ESD 2 functions in a paramilitary manner. This is to ensure that when personnel are engaged in rapidly changing circumstances in an emergency situation, clear and concise direction from a central authority (Incident Commander) is followed without delay. Cultural norms tend to relax the formality of this structure during routine operations but is nonetheless followed. The paramilitary structure must be supported by standardized sets of rules, regulations, and policies that guide appropriate behavior and accountability. These guiding documents are vital for success in all phases of the fire department operation at all levels.

SC-ESD 2 has a complete set of regulatory documents, both guidance and directive in nature. Training is conducted on SC-ESD 2 policies. The regulatory documents are regularly updated by SC-ESD 2 staff. The SOGs are utilized in training evolutions. The regulatory documents are internally reviewed for consistency and for legal mandates.

All of these documents should be reviewed and revised as appropriate on a planned cycle. ESCI recommends that one-third of the documents be reviewed each year so that the complete set is reviewed and revised every three years.

Internal Assessment of Critical Issues

Public safety agencies routinely face a complex array of new critical issues and emerging challenges. Some public safety leaders unwisely choose to face these issues and challenges alone and forego the benefits of involving numerous talented and capable members of the organization at all levels. The fire chiefs of the 11 departments and the SC-ESD 2 Fire Chief have reached a consensus of the following critical issues facing the organization.

Figure 35: Critical Issues as Identified by the Fire Chiefs

Critical Issue	Description
First	Station Staffing
Second	Cherokee County Response
Third	Training
Fourth	Infrastructure

The items in the previous figure require engaging with SC-ESD 2's leadership and the District Commissioners, to develop strategies to address root causes and potential solutions. Doing so will improve service to the community and it will likely result in an improved Public Protection Classification (PPC), lowering some annual fire insurance premiums within the District.

Internal and External Communications Processes

SC-ESD 2 should consider spending additional time and effort into its internal communications. As an example, staff meetings are held sporadically, and no written minutes have been taken during staff meetings. Written memorandums are utilized to get information out to personnel via email. All members have email access and email addresses. SC-ESD 2 does not have a member newsletter, but member forums (all-hands meetings) are done quarterly county-wide and through Chiefs' meetings. The Fire Chief and his staff subscribe to an open-door policy and there is a vertical communication path clearly identified (chain of command).

External communication with the community is primarily through the District's website and advisory committees. No community newsletter is issued to District citizens. SC-ESD 2 has a formal complaint process in place but does not issue community surveys.

Record Keeping and Documentation

In any organization, documentation of activities is of paramount concern. Sound management decisions cannot be assured without the collection and analysis of meaningful data, which is gathered in records routinely.

SC-ESD 2 has implemented sound processes for documentation control. Public records access is provided for by department policy. Hard copy records are secured by lock and key in fire safes/Access Control. All computer files are backed up daily on- and off-site. Electronic files are secured by passwords (as per District IT Administrative Standard) which are assigned to users with rights to appropriate documents. The software utilized for documenting fires is ResponseMaster 1.0.

SC-ESD 2 provides monthly financial, managerial and operational reports to elected officials. No annual reports are produced or distributed. All testing records are in place for incident and exposure records. Maintenance records of self-contained breathing apparatus (SCBA), ladders, breathing air from the cascade system, and gas monitors (as needed) are kept by third-party contractors. Hose and pump testing are performed internally on an annual basis. Vehicle maintenance records are retained in the documentation system (ResponseMaster 1.0).

Security

Facilities, equipment, and records are all important elements to a fire and emergency services agency. A significant investment of public dollars was made to provide for the services SC-ESD 2 provides to the community. Thus, it is critical that proper precautions are taken to protect those investments and those records from loss, whether intentional or otherwise.

SC-ESD 2's buildings/facilities and offices are secured by Access Control Systems. SC-ESD 2's computers are secured inside buildings or vehicles where personnel must have keys or access control cards/fobs to unlock doors and then have a valid username and password to gain access. Emergency response vehicles are located within a secured facility (station) until responding to alarms.

Recommendations:

- Review mission, vision, and value statements to shorten them and ensure that they are meeting the needs for today and the future.
- Review one-third of the SOGs/Rules and Regulations document(s) each year so that the complete set is reviewed and revised every three years or less.
- Conduct monthly staff meetings.
- Take minutes for the senior and/or staff meetings.
- Develop member newsletters to ensure that communication is distributed throughout the organization.
- Hold Company Officer's meetings and take meeting minutes.
- Consider implementing closed circuit television to reach outlying stations (Fire Chief's monthly address to personnel, other remote meetings).

PLANNING FOR FIRE PROTECTION AND EMERGENCY MEDICAL SERVICES

Current Planning Processes

Emergency services exist in a rapidly changing environment. Along with improved tools and technologies used to provide service, there is the increased regulation of activities, new risks to protect, and the other challenges that can quickly catch the unwary off guard. Only through continuous internal and external environmental scanning, awareness, and periodic course corrections can an organization stay on the leading edge.

To do a better job with available resources, the organization must focus on improving services while identifying programs or activities that may no longer serve its changing needs. Through appropriate planning, a fire department can establish a vision for the future, create a framework within which decisions are made, and chart its course to the future. The quality and accuracy of the planning function determine the success of the organization.

The planning process within the SC-ESD 2 has satisfied the District's needs to date. While the community has grown and developed, the fire department was consistently able to provide the level of service desired by the community. SC-ESD 2 is now facing several challenges related to the delivery of fire service within the community that will require the planning efforts of the District to be more formally integrated within the community it serves. Discussions with the District leadership reveal that all have the same unanswered questions: Where does SC-ESD 2's current service delivery stand in relation to the needs of the community; what should the fire department look like in 5 to 10 years; and how do "we" get from here to there?

To be truly effective, an emergency services system must consider planning for the future on five distinct levels:

Figure 36: Planning for the Future

Planning Level	Description
Tactical Planning	The development of strategies for potential emergency incidents.
Operational Planning	The organization of day-to-day activities, as primarily outlined by the department's standard operating guidelines and procedures. This includes the integration of the agency into other local, regional, or national response networks.
Master Planning	Preparation for the long-term effectiveness of the agency as the operating environment changes over time.
Strategic Planning	The process of *identifying* an organization's mission, vision, and values *and prioritizing goals and objectives* for things that need to be accomplished in the near future.
Community Risk Planning	The process of identifying potential critical risks and threats facing the community with the intent to mitigate their impacts and positively impacting recovery.

SC-ESD 2 performs some fundamental, short-term planning in the form of the annual budget development process, which is used to define the activities and priorities identified for the upcoming year. However, establishing a long-term planning perspective for the District is important as well. Without a plan, it is impossible for an organization to know when it is reaching milestones or providing exceptional services.

The District has not established a formalized and adopted planning process, and historical planning has been limited to some basic strategic planning efforts, pre-incident planning, and annual work plan development. Commendably, recent initiatives have been implemented to address planning needs including this master planning process as well as a strategic plan.

Tactical Planning

Normally, a firefighter's first visit to a building typically occurs when the building is involved in a fire or other emergency. This is also the point in time where the internal environment is at its worst. Contrary to movie portrayals of the inside of a building on fire, visibility is at or near zero due to smoke. A lack of familiarity with a building can easily lead a firefighter to become disoriented or injured by an unfamiliar internal layout, or by equipment or other hazards that might be encountered.

It is critically important that firefighters and command staff have comprehensive, accurate information readily at hand to identify hazards, direct operations, and use built-in fire-resistive features. This can only be accomplished by building familiarization tours, developing pre-fire plans, and conducting exercises either on-site or by tabletop simulation.

Within the District, fire inspections are conducted by the Smith County Fire Marshal's Office for the purpose of fire code enforcement, but there is no formal program to routinely share that information with the District. That said, the District and its fire departments conduct some pre-planning visits, however, the pre-incident plans that have been completed are described as "limited."

As an example, there are no specific hazard plans or hazardous materials planning. Since SC-ESD 2 responds to all hazardous materials incidents within the District and provides operations level response, and Smith County contracts with Tyler Fire Department for hazardous materials services at the Technician level with assistance from SC-ESD 2 as needed, the District is encouraged to (1) develop and maintain effective pre-incident, pre-fire, and special hazard plans, and to (2) incorporate the plans routinely into dispatch communications. Further developing and maintaining the program should be considered a priority for SC-ESD 2. A defined list of "target hazards" should be developed and aggressive effort taken to ensure response crews have ready access to the plans. Target hazards are defined by:

- Buildings with large potential occupant loads.
- Buildings with populations who are partially or completely non-ambulatory.
- Buildings of large size (greater than 12,000 square feet).
- Buildings that contain or process hazards (hazardous materials or equipment).

Pre-incident plans should be easy to use, quick reference tools for company officers and command staff. At a minimum, a pre-incident should include information such as:

- Building construction
- Occupant characteristics
- Incorporated fire protection systems
- Capabilities of public or industrial responding personnel
- Water supply
- Exposure factors
- Facility layouts

NFPA 1620 provides excellent information on the development and use of pre-incident plans and should be used as a reference. Once pre-incident plans are established and/or updated, training should be provided to all personnel who may respond to an incident at those locations. In addition, copies of pre-incident plans, blueprints, and drawings should be available on each response vehicle (MDT, 3-ring binder, etc.) and incorporated into dispatch procedures.

Operational Planning

Operational planning includes the establishment of minimum staffing policies, standardized response protocols, regional incident command planning, mutual aid, automatic aid planning (locally and regionally), resource identification and planning, and disaster planning.

Within an agency, operational plans should be in a place that assures that adequate volumes of the appropriate types of resources are deployed to an emergency. Doing so involves:

- Identification of potential risk types.
- Determination of resources needed to mitigate an incident affecting the particular risk type.
- A methodology of assuring that adequate resources are dispatched to an incident via 911 center protocols.

Looking outside of the agency's own resources, operational plans need to address the timely implementation of mutual and automatic aid. To do so, the identified risk exposures and resources needs are incorporated into mutual aid agreements. Further, of significant importance, automatic activation of mutual aid deployment is seamlessly incorporated into the 911 center's Computer Aided Dispatch (CAD) systems. The current system that SC-ESD 2 uses is a "box alarm" system.

Strategic Planning

This Master Plan contains an extensive list of recommendations and advises for changes and new initiatives. This, the most effective way to prioritize and plan for the implementation of the Master Plan findings is using the strategic planning process. A strategic plan is a dynamic tool that, when kept current, can be used to assist in guiding an agency into the future. It provides not only a defined sense of purpose and direction but also a map to chart the course for the agency moving forward.

A strategic plan involves a three- to five-year planning window and establishes prioritized goals and objectives for the organization. The planning approach is particularly important when a master plan has been completed. The reason is that a master plan identifies multiple recommendations and future strategies, which are then evaluated and prioritized within the strategic plan.

Establishing a customer-oriented strategic plan accomplishes the following:

- Development of a mission statement giving careful attention to the services currently provided and which logically can be provided in the future.
- Development of a vision statement of the agency moving forward.
- Establish the values of the members of the agency.
- Identification of the strengths, weaknesses, opportunities, and challenges of the agency.
- Determination of the community's service priorities.
- Understanding the community's expectations of the agency.
- Establishment of realistic goals and objectives for the future.
- Identifications of implementation tasks for each objective.
- Definition of service outcomes in the form of measurable performance objectives and targets.

SC-ESD 2 has committed to completing a Strategic Plan following completion of this Master Plan. District-conducted customer surveys of citizens, businesses, and elected officials are expected to be included in the planning process. ESCI is positioned to assist with the process.

Community Risk Planning

Following the terrorist events of 9/11, all-hazards emergency management is now part of everyday life. Mindful community governments prepare themselves, other institutions, businesses, and the public to survive a disaster by mitigating hazards to eliminate or reduce risk. By developing and maintaining emergency action plans, and by exercising and updating the plans regularly, municipal governments/districts help limit (or manage) the consequences of a disaster. The common term for governmental disaster preparedness is emergency management.

The Superfund Amendment and Re-authorization Act, found in Title III of the Federal Code (SARA Title II), defines requirements for tracking of hazardous materials used in fixed facilities and establishes requirements for emergency response planning, including the establishment of one or more Local Emergency Planning Committee(s). The LEPC is charged with the responsibility to identify and collect information on the use of hazardous materials by private and public entities. Information collected includes the type of material, quantity, and the location at each site. Additionally, the LEPC is charged with ensuring local response plans are adequate based on potential risk. The District actively participates with the existing LEPC at the county level to ensure a well-planned, trained, and equipped response within the District to incidents involving hazardous materials.

SARA Title III requires industries that use over the threshold limit of certain highly hazardous materials (extremely hazardous substance facilities, or EHS facilities) must develop comprehensive emergency plans for their facility. The act requires that local fire departments coordinate with the involved industry to ensure a quality response to the emergency.

As part of the District's disaster response capabilities, SC-ESD 2 has procured, trained with, and deployed a mobile command center, mobile maintenance trailer, and mobile radio antenna/repeater system capable of establishing interoperable communications if the primary system fails. These capabilities were used with Hurricane Harvey, recent tornadoes, and other large-scale events.

Long Range Master Planning

ESCI has been contracted to complete this Master Plan and Strategic Plan for Smith County Emergency Services District No. 2. Upon speaking with command staff at the site visit, ESCI was advised that SC-ESD 2 has a capital improvement plan for facilities and apparatus and a financial plan that are updated regularly, but emergency plans, including county plans to which the District is a signatory, expire in FY 2020.

Recommendations:

- Establish and train on pre-fire plans and target hazard location lists with Fire Inspectors and fire crews.
- Establish automatic aid agreements with surrounding communities or follow State of Texas 12-hour mutual aid.
- Utilize community involvement with surveys and/or community meetings.
- Ensure that SC-ESD 2 or City of Tyler Fire Department belongs to LEPC to ensure that hazardous materials sites are monitored and/or reported.
- Establish emergency management plans for the District and its departments: Continuity of Operations Plan (COOP), Comprehensive Emergency Management Plan (CEMP), All-Hazards Mitigation Plan (AHMP), Emergency Response Plan (ERP), Community Wildfire Protection Plan (CWPP), and weather-related annexes to the Basic Plan.

CAPITAL ASSETS AND CAPITAL IMPROVEMENT PROGRAMS

Emergency response requires a balance of people, equipment, and facilities. The following section will focus on the two-primary capital assets, facilities and apparatus. The *Agency Analysis and Equity Analysis* provided by ESCI in 2017 evaluated all facilities in SC-ESD 2. This analysis will build on that report, identify changes over the past two years, and focus on the facilities that require attention in the foreseeable future.

Facilities

SC-ESD 2 is currently facing dynamic, fast-paced changes in response capabilities and staffing plans. These changes are required to meet the emerging needs of the District at the region transitions from predominantly rural, bedroom communities to urban pockets and the associated challenges related to these growth patterns.

In 2012, SC-ESD 2 developed a 10-year plan for the remodel/replacement of stations and the purchase of apparatus. By 2018, four years ahead of schedule, SC-ESD 2 has accomplished many capital and facility goals, including the completion of Chapel Hill, Dixie, and Winona stations. Arp Station 1 and Flint-Gresham Station 1 should be completed by August 2020. The current ESCI analysis shows a need to replace the administration facility and consider the future construction of a District training facility.

Several SC-ESD 2 stations are in good to excellent condition and with some basic upgrades, including living quarters for volunteer and paid personnel, will serve the District well into the future. The most notable challenge identified in this process is the inconsistency throughout the District of station design, capacity, and capability. This is certainly expected with the coordination and harmonization of 11 independent fire departments. Stations in greatest need of extensive refurbishment or replacement are:

- Arp Station 1 (new station scheduled for completion August 2020)
- Flint-Gresham Station 1 (new station scheduled for completion August 2020)
- Jackson Heights Station 1 (not scheduled, needs immediate replacement of driveway/apparatus pad)

Figure 37: Jackson Heights Station 1 Driveway and Apparatus Pad

The resource staffing plan that has been utilized over the past five years has resulted in excellent progress at an ever-increasing pace. The primary consideration is the goal to provide two-person paid staffing, supplemented by active and certified volunteers, round-the-clock, in all 11 departments, contingent upon available funding. This process is an exciting and necessary progression for SC-ESD 2, but will require numerous facility upgrades to ensure safe, efficient, and code-compliant facilities. Stations that need living quarters in order to support round-the-clock staffing are:

- Arp Station 1
- Dixie Station 1
- Flint-Gresham Station 2
- Jackson Heights Station 1
- Jackson Heights Station 2
- Winona Station 1
- Winona Station 2
- Winona Station 3

The following figure provides detailed summary information regarding each facility in the District.

Figure 38: Current Facilities Summary

Fire Department and Station Number	Size	Condition/Comments
Arp VFD, Station 1	3,600 sf	Very poor
Arp VFD, Station 2	5,400 sf	Good
Arp VFD, Station 3	1,600 sf	Good/Apparatus bays only, no power
Bullard VFD, Station 1	6,500 sf	Good Condition/24-hour capability
Bullard VFD, Station 2	3,200 sf	Good Condition/24-hour capability
Chapel Hill VFD, Station 1 (2 buildings)	6,600 sf 4,000 sf	Excellent, 24-hour capability Fair, apparatus bays and storage space
Dixie VFD, Station 1	7,000 sf	Good Condition recent remodel
Dixie VFD, Station 2	5,000 sf	Good Condition/24-hour capability
Flint-Gresham VFD, Station 1 (new)	10,000 sf	Under construction, Aug 2020 completion
Flint-Gresham VFD, Station 1	5,000 sf	Very poor
Flint-Gresham VFD, Station 2	4,500 sf	Fair condition/No living quarters
Jackson Heights VFD, Station 1	5,500 sf	Poor Condition/No living quarters
Jackson Heights VFD, Station 2	3,000 sf	Excellent Condition/No living quarters
Noonday VFD, Station 1	10,000 sf	Fair Condition/24-hour capable
Red Springs VFD, Station 1	12,000 sf	Good Condition/24-hour capable
Red Springs VFD, Station 2	3,000 sf	Good Condition/24-hour capable
Troup VFD, Station 1	16,000 sf	Excellent Condition/Living quarters
Troup VFD, Station 2	2,500 sf	Poor, Cherokee County
Troup VFD, Station 3	2,500 sf	Poor, apparatus bays only
Whitehouse VFD, Station 1	8,000 sf	Excellent Condition/Living quarters
Winona VFD, Station 1	5,000 sf	Fair Condition/No living quarters
Winona VFD, Station 2	4,500 sf	Fair Condition/No living quarters
Winona VFD, Station 3	3,400 sf	Excellent, no living quarters
SC-ESD 2 Fleet Maintenance Facility	8,000 sf	Good, with potential for expansion
SC-ESD 2 Administration Building	2,500 sf	Poor, leased facility

Apparatus and Other Vehicles

SC-ESD 2 has demonstrated an excellent capacity for the planning and implementation of a program for capital assets. The 10-year capital plan developed in 2012 also included the replacement of apparatus. At the time, 18 apparatus were considered in need for replacement over the next 10 years. This includes engines, aerials, tankers (water tenders), rescue units, and brush trucks. SC-ESD 2 has already replaced six units, with the apparatus shown in the following figure left to replace. Note that current replacement plans do not include replacement of some units in order to streamline the number of apparatus in the District.

Figure 39: Apparatus Inventory

Department	Type	Year	Condition	Mileage	Status	Target Replacement Date
Bullard	Engine 8	1984	Fair	29,736	Frontline	2020
Whitehouse	Engine 2	1985	Fair	52,195	Reserve	Remove from system 2020
Dixie	Engine 3	1987	Fair	23,669	Reserve	Removed from system 2019
Red Springs	Tanker 5	1989	Fair	228,079	Frontline	2022
Chapel Hill	Brush 3	1991	Fair	110,365	Frontline	2021
Troup	Rescue 4	1994	Fair	Not reported	Frontline	N/A
Bullard	Engine 2	1995	Fair	54,919	Frontline	2020
Troup	Engine 2	1999	Fair	Not reported	Frontline	Not in SC-ESD 2 system
Flint-Gresham	Ladder 2	2000	Fair	89,370	Frontline	2025
Noonday	Engine 2	2000	Fair	Not reported	Frontline	2024
Troup	Rescue 8	2003	Fair	Not reported	Frontline	Not planning replacement
Dixie	Brush 4	2004	Fair	Not reported	Frontline	2023

ESCI recommends that the District update its apparatus replacement plan in 2020 to include target replacement dates and source of funds. Implementation of this recommendation will ensure replacement plans are well-communicated, and will keep pace with department operational needs and financial resources. ESCI also recommends the replacement plan transition to a ten-year rolling plan with annual updates that includes both apparatus and other vehicles. Finally, ESCI recommends that the District include in the apparatus replacement plan an audit of equipment usage and need to determine if some apparatus should be moved to other locations or retired without replacement to reduce overall capital equipment cost.

NFPA 1901, 1911, and 1912 are applicable standards for the purchase, refurbishment, maintenance, and retirement of fire apparatus. ESCI supports Annex D of these standards as they relate to the evaluation, maintenance, upgrade, and replacement schedules for heavy fire apparatus (engines, tankers, and ladder trucks). Generally, the annex recommends a maximum of 15 years of frontline service, followed by a maximum of 10 years in reserve status, followed by removing the unit from service. However, usage and condition can have a significant effect on the resource role during its life expectancy. Thus, the following figure should be a useful guide for the District and will provide a simple, formulaic approach to apparatus replacement.[6]

Figure 40: Apparatus Replacement Criteria

Evaluation Components	Points Assignment Criteria
Age	One point for every year of chronological age, based on in-service date.
Miles/Hours	One point for each 10,000 miles or 1,000 hours.
Service	1, 3, or 5 points are assigned based on type of service unit receives. The more severe the service, the higher the number of points.
Condition	1, 3, or 5 points are assigned based on body condition, rust, interior condition, accident history, anticipated major repairs or upgrades, and similar items. The lower the condition, the higher the number of points.
Reliability	1, 3, or 5 depending on the frequency that a vehicle is out of service for repair. The lower the reliability, the higher the number of points.

Point Ranges	Condition Rating	Condition Description
Under 18 points	Condition I	Excellent
18 to 22 points	Condition II	Good
23 to 27 points	Condition III	Consider Replacement
28 points or higher	Condition IV	Immediate Replacement

Small Tools and Equipment

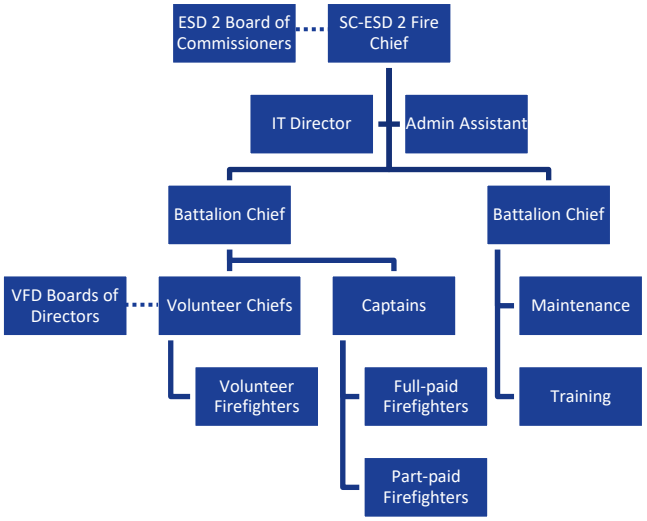
Additional capital equipment and facility upgrades will be required, especially in conjunction with the progression to round-the-clock staffing models. A plan for capital equipment such as SCBA, compressors, small equipment, rescue tools, and radios should be maintained separately, but linked to the facilities and apparatus plans to ensure equipment interoperability and connectivity with those plans.

STAFFING

As described previously, SC-ESD 2 is a combination system comprised of District personnel, with both full-time and part-time employees, and volunteers associated with one of 11, independent service providers. The District Fire Chief is the administrative head of the system and serves under the general supervision and direction of the SC-ESD 2 District Board of Commissioners. The District has 41 approved positions—seven administrative staff positions and 34 operations positions (24 full-time and 10 part-time). Part time positions are filled from a pool of 74 part-time employees. Each of the 11 service providers are volunteer fire departments with a Board of Directors, volunteer Chief, members, and independent rank structure. Collectively, the 11 departments of SC-ESD 2 have about 290 volunteers.

Thus, SC-ESD 2 is a unique combination system. The following figure illustrates the command structure and the corresponding span of control.

Figure 41: SC-ESD 2 Command Structure



Leadership and Administrative Support

Like any other part of a fire department, administration and support need the appropriate resources to function properly. Too large an emphasis on administrative staffing can have as much detrimental influence on the efficient functioning of an organization as too little. It is important to achieve an appropriate balance between the administration and support side of a department and its operational side. Without sufficient oversight, planning, documentation, training, and maintenance, the operational entities of a fire department will struggle to perform their duties well.

Administration and support services require appropriate resources to function properly. Organizational success may depend upon it. ESCI believes a general target for administrative and support staff to line staff to be between 12–15 percent, or one administrative position for every 6–8 line positions. Currently, the District has a ratio of 17 percent, or one administrative position for every 5–9 line positions. In this particular situation each support staff member is performing multiple duties and accomplishing required tasks in an efficient manner.

SC-ESD 2 administrative and support staffing is detailed in the next figure.

Figure 42: Administrative and Support Staff

Position	Number
Fire Chief	1
Battalion Chief	2
Fleet Mechanics	2
Administrative Assistants	2
Total	7

Operations

Two types of operations personnel serve the SC-ESD 2 community—paid personnel employed by the District and volunteer members of each contract service provider. The District has 34 approved operations positions (24 full-time and 10 part-time). Part-time positions are filled from a pool of 74 part-time employees. Volunteers provide approximately 300 personnel to the system. Current staffing levels are:

Figure 43: Operations Personnel by Rank

Position	Number
Captain	2
Firefighter—Career, Full-time	22
Firefighter—Career, Part-time	10
Volunteer Fire Chief	11
Firefighter—Volunteer	290
Total	337

Collectively, the 11 departments of SC-ESD 2 have about 290 volunteers. However, this number is somewhat misleading. Consider this:

- Total number of people carried on rosters for all departments in SC-ESD 2 **290**
- Total number of people that made less than one call per month for 2018 **110**
- Total number of people that made at least 10% of calls for their department **94**
- Total number of people that made 10% of the calls for their department AND were certified by either SFFMA or the TCFP to make entry **54**

Thus, only 18 percent of all volunteers on department rosters are certified by SFFMA or TCFP as structural firefighters and make more than 10 percent of all department calls. As stated earlier, this underscores the need for a combination system; that is, a system that includes both paid District personnel and department volunteers to ensure an adequate initial response with a sufficient number of personnel to perform critical tasks. This is the most critical issue facing the District at this time.

The goal of the District is to provide round-the-clock staffing with two paid personnel and two volunteer personnel at each of the 11 departments. However, given the current available funding and lack of active volunteers, round-the-clock staffing is not possible at this time, and staffing is considered one of the primary challenges facing the District over the next five years. Current staffing levels are:

Figure 44: Current Staffing Schedule

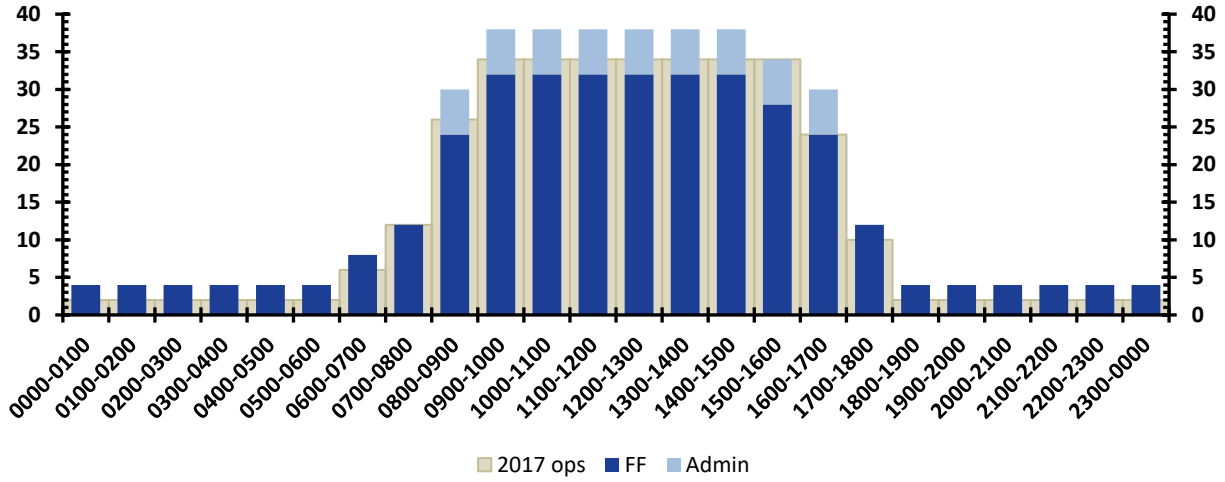
Community	Station	Staffing	Community	Station	Staffing
Arp	1	M–F 7a–4p	Noonday	1	24/7
Arp	2	M–F 9a–6p	Red Springs	1	M–F 8a–5p
Arp	3	Not Staffed	Red Springs	2	24/7
Bullard	1	M–F 6a–3p	Troup	1	M–F 8a–5p
Bullard	2	M–F 8a–5p	Troup	2	Not Staffed
Chapel Hill	1	M–F 8a–5p	Whitehouse	1	M–F 8a–5p
Dixie	1	M–F 7a–4p	Winona	1	M–F 6a–3p
Dixie	2	M–F 9a–6p	Winona	2	Not Staffed
Flint Gresham	1	M–F 9a–6p	Winona	3	M–F 8a–5p
Flint Gresham	2	Not Staffed			
Jackson Heights	1	Not Staffed			
Jackson Heights	2	M–F 8a–5p			

As shown, all departments have two-person paid staffing for at least 9 hours, Monday through Friday. Staggered shift times extend paid coverage to 11 hours Monday through Friday in Arp, Bullard, Dixie, and Winona.

Five of the 21 stations (24 percent) are not staffed on a regular basis; emergency response from those stations is provided by volunteers only. Two stations (Noonday and Red Springs 2) are staffed round-the-clock, seven days a week. The remaining stations are staffed during the weekday; emergency response at all other times is provided by volunteers.

As shown in the following figure, there are at least four operations personnel on duty around-the-clock, seven days a week. From 0700 to 1700, Monday through Friday, at least 10 operations personnel are on duty. During peak hours from 0900 to 1500, Monday through Friday, there are a total of 38 certified firefighters on duty—32 operations personnel and 6 admin personnel (1 Mechanic certified as Firefighter, 2 Captains, 2 Battalion Chiefs, and the Fire Chief).

Figure 45: Operational Staffing Levels, Monday–Friday, by Hour of Day



As shown, there has been an increase in the number of operational staff on duty when compared to 2017. This is due to increasing need and availability of funding. These amount of operational staffing increases are shown in the following figure.

Figure 46: Comparison of On-Duty Firefighter Staffing, 2017 to Current

Time	2017	2018	% Change
0000–0600	2	4	**100%**
0600–0700	6	8	**33%**
0700–0800	12	12	**0%**
0800–0900	26	32	**23%**
0900–1500	34	38	**12%**
1500–1600	30	34	**13%**
1600–1700	24	30	**25%**
1700–1800	10	12	**20%**
1800–0000	2	4	**100%**

SERVICE DELIVERY AND PERFORMANCE

For any service organization, one of the most important and visible elements to the public is the ability to deliver services in a timely fashion. The study of service delivery and performance allows a department to identify multiple facets of its organization, such as when and where incidents are most likely to occur, how often incidents will occur in a given location, and areas where resources are unable to reach that location within a given period of time. In this section, ESCI used data obtained from SC-ESD 2 to conduct an in-depth analysis of how multiple variables throughout the service delivery system affected its ability to deploy emergency resources and provide baseline performance metrics for the delivery of these services.

The operational components of service delivery and performance have been analyzed by ESCI from multiple perspectives including service demand, distribution, resource concentration and reliability, and response performance. In order to provide the highest level of service to the citizens and visitors of Smith County, the sum of all these components must be effective and efficient. This is achieved with efficient notifications of incidents and rapid responses from effectively located facilities with appropriate typed apparatus staffed with an adequate number of properly trained personnel. This section will provide a current analysis of service delivery and response performance in the SC-ESD 2 service area. The Service Delivery and Performance section is broken into several subsections, each exploring a specific topic related to the delivery of emergency services.

Data Sources

During the initial phases of analysis, it was discovered that several time variables were missing from the dataset provided by SC-ESD 2. Specifically, times relating to call creation, unit travel, and unit arrival were not available. Their absence prevented ESCI from calculating call processing, turnout, and travel times. These are common metrics that our analyses usually highlight. At the time of the report, no solution had yet been discovered. Due to these missing measures, three of our standard measures will be missing from the analyses conducted within the service delivery section. However, sufficient data points were present to complete the analysis. All calls were counted and appear in several tables with a frequency count of 6,752 incidents occurring between January 1, 2017, and December 19, 2018 (study period). When response times were calculated to be zero seconds (n = 413), they were dropped from computations involving means and 90th percentile measures. The same applies to committed times: when zero (n = 226), they were counted as calls but excluded from statistical computations.

While not specific to Smith County, it should also be noted that ESCI has historically found issues with incident reporting data in the State of Texas. It is possible that similar issues could have caused inaccurate analysis in some areas of this report. Based on this, it is recommended that SC-ESD 2 further investigate these concerns along with the previously noted data issues.

Service Demand Study

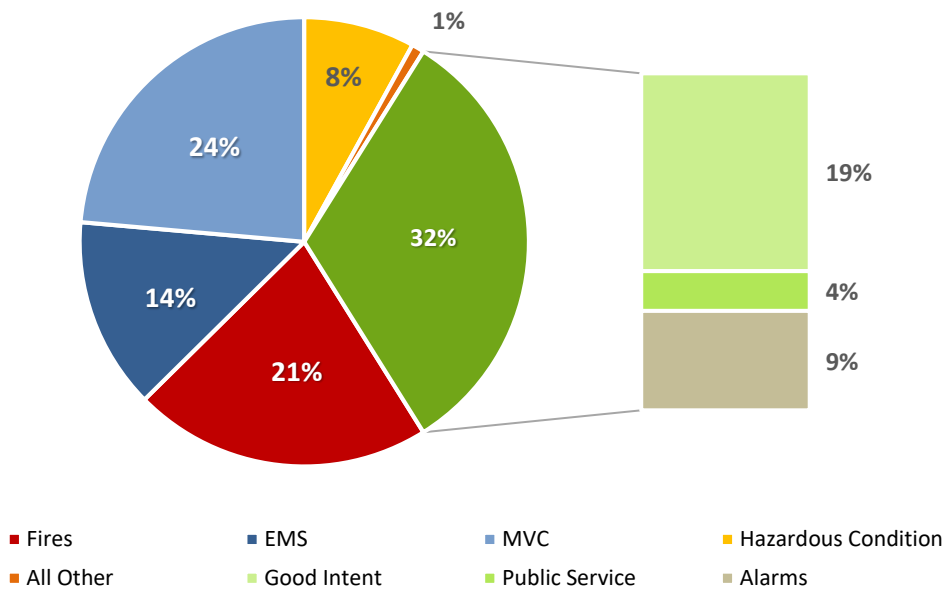
In this section, service demand was analyzed to provide insight into the type of incident, and when and where emergency incidents are most likely to occur. Three analyses are included:

- Incident Type
- Temporal Analysis
- Incident Location

Incident Type

The following figure illustrates historical service demand by NFIRS incident type for 2017 and 2018. Due to changes in incident reporting systems and other factors, it is believed that the 2017 data is incomplete and does not accurately reflect the entire year.

Figure 47: Service Demand by Incident Type, 2017–2018



As shown, emergency responses varied significantly by call type over the course of the study period:

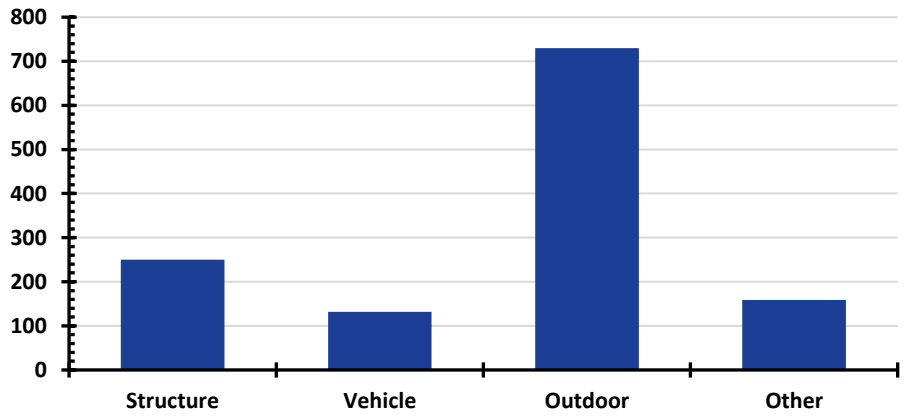
- 21 percent of all responses were for fires
- 24 percent were for motor vehicle collisions (MVC)
- 14 percent were for emergency medical calls not involving MVC
- 8 percent were for hazardous conditions
- 1 percent were for other emergencies
- 32 percent were responses where no emergency existed
    - 23 percent were "good intent" or "public service" calls
    - 9 percent where false alarms

Clearly, the NFIRS data indicates that most service demand—79 percent—is for emergencies that are not fires. In fact, the most-common response type is to accidents involving motor vehicle collisions (MVC). This is not surprising given the number of major transportation routes, including IH-20, and smaller two-lane roads that cross the District.

Of note is the high percentage of non-emergency calls—32 percent of all calls. Almost one in three calls for service turns out to be a non-emergency; almost one in ten is a false alarm. This suggests there is an opportunity for public education to reduce the number of non-emergency calls. That is not to suggest that citizens should be discouraged from calling for service; it simply indicates that there is a risk of extended response times if the nearest unit is already committed on a non-emergency call when an emergency call in the same areas is received.

Also of note is the number of fire calls—21 percent of all calls for service. This is higher than ESCI finds for most jurisdictions in Texas (about 4 percent of all calls). Of all fire calls, 20 percent were for structure fires (including fires in mobile homes, motor homes, and camping trailers), 10 percent were vehicle fires, 57 percent were for outdoor fires, and the remaining 13 percent were not categorized. This is shown in the following figure. Of significance is the large amount of outdoor and other fires—about 70 percent of all fires as compared to 53 percent for all Texas fire departments. Given the rural nature of the district, this is to be expected.

Figure 48: Fire Responses by Type, 2017–2018



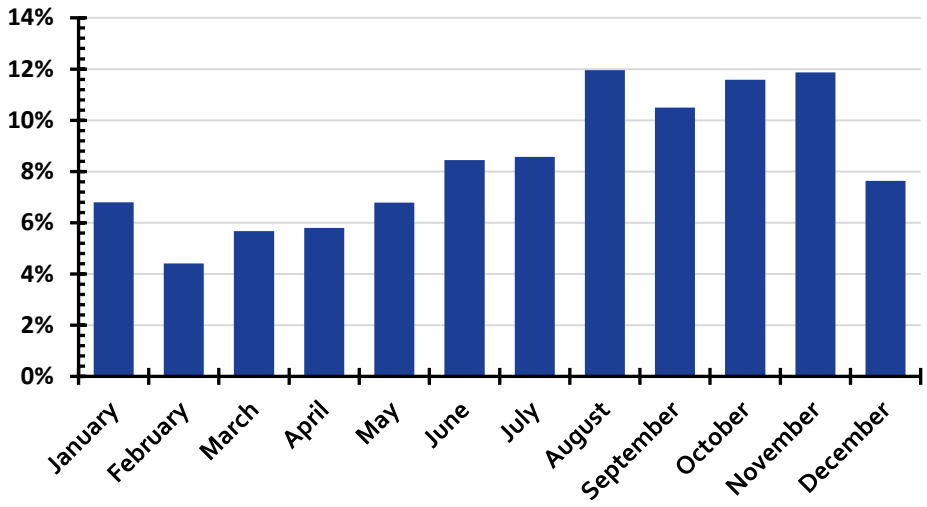
In light of the limited funding available, the relatively low number of structure fires—4 percent of all responses—suggests that the model currently used by the District of two-person paid staffing supplemented by two or more volunteers may be most appropriate, if multiple units are dispatched to ensure arrival of an effective response force that is sufficient to accomplish required tasks.

Temporal Variation

Demand for services can often occur in cyclical patterns. Temporal variation analysis is helpful in order to determine if there are specific trends during various time measurements where staffing can be modified to better fit the demand. In order to determine if these patterns exist, the following figures, including illustrations by month, day, and hour, are presented and each is discussed. This information will provide insight to SC-ESD 2 as to when they can anticipate increases and decreases in service demand based on historical patterns.

The next figure illustrates service demand for all incident types by month during the study period based on SC-ESD 2 data.

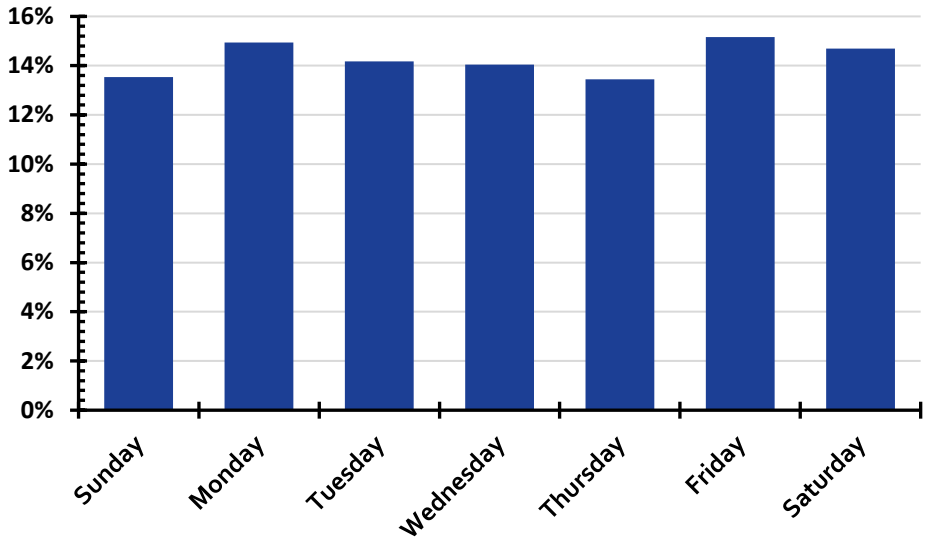
Figure 49: Service Demand by Month, January 1, 2017–December 19, 2018



Late summer and fall have the highest demand; winter and spring the lowest. February has the lowest demand, but it is also the shortest month. March and April are close behind. August, November, and October have the highest demand, in that order.

The next figure continues the temporal analysis with an examination of service demand by day of the week.

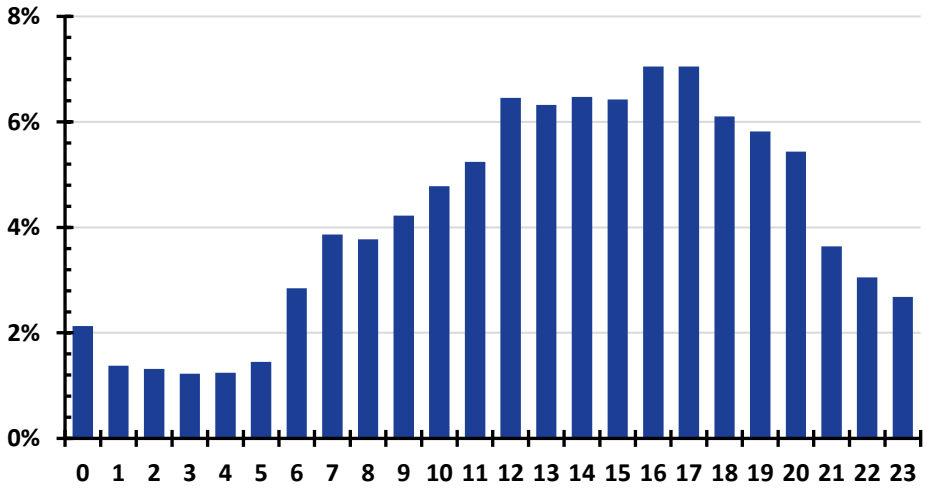
Figure 50: Service Demand by Day of Week, January 1, 2017–December 19, 2018



As illustrated in the preceding figure, service demand by day of the week remained relatively consistent. Typically, the most noticeable variation occurs during the weekends when service demand decreases. This is expected as more activity occurs during the work week such as an increase in transient population tied to the retail/commercial labor force. In general, more activity occurs during the work week. While SC-ESD 2's data does show decreased demand on Sundays, Thursday was actually the slowest demand day which does vary slightly from what ESCI typically finds. During the study period, Thursday accounted for just over 13 percent (13.45%) making it the slowest day on average for service demand. Friday accounted for an average of over 15 percent (15.15%) of the service demand for SC-ESD 2 making it the busiest day of the week. This may suggest that recreational activities on the weekends are a key driver of service demand and that demand is not as closely linked to commercial activities that would occur during the work week from Monday through Thursday. The range between the busiest day and the slowest day is just under two percent (1.72%).

The final temporal analysis of service demand examines demand summarized by hour of the day and is illustrated in the next figure.

Figure 51: Service Demand by Hour of the Day, January 1, 2017–December 19, 2018



Analysis of service demand in regard to specific times of the day revolves largely around the activities of the general population with workload increasing during daytime hours and decreasing during nighttime hours as illustrated in the preceding figure. Incident activity is at its highest between 9:00 a.m. and 8:00 p.m. Over 70 percent (71.38%) of SC-ESD 2's calls for service occurred between these hours which would be expected. The highest incident activity is at 4:00 p.m. and 5:00 p.m. with both time ranges accounting for over seven percent (7.05%) of the total activity per day. The slowest hour for activity is at 3:00 a.m. which accounted for less than two percent (1.23%) of the days' call activity during the study period.

Of note is that while demand is lower in the early morning hours, residential fatal fires occur most frequently late at night or in the early morning. From 2014 to 2016, residential fatal fires were highest between 1:00 a.m. to 2:00 a.m. The 8-hour peak period (11 p.m. to 7 a.m.) accounted for 48 percent of residential fatal fires.[7]

The temporal variation of service demand provides some insights as to when SC-ESD 2 can expect increased service demand in its jurisdiction. Although some errors are present, the conclusion that service demand totals are dependent upon activity within the jurisdiction can be asserted. Based on this observation, SC-ESD 2 should generally expect increases in service from 9:00 a.m. through 8:00 p.m., from August through November, particularly on Fridays.

Distribution and Deployment

A statistical analysis of 2018 emergency response for SC-ESD 2 demonstrated overall efficiency and the District-wide pattern of both call location and District response. The next figure illustrates the number of events where the specific department had a unit first on the scene. The focus was on fire responses specific to structure fires, wildland fires, and categorized rescues not including extrication responses to motor vehicle collisions (MVC).

Figure 52: Structure Fires, 2018

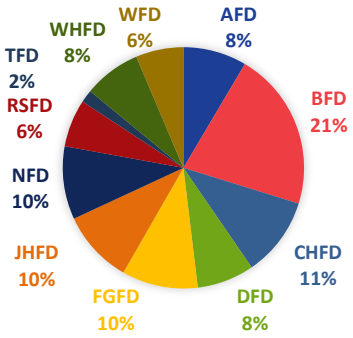


Figure 53: Wildland Fires, 2018

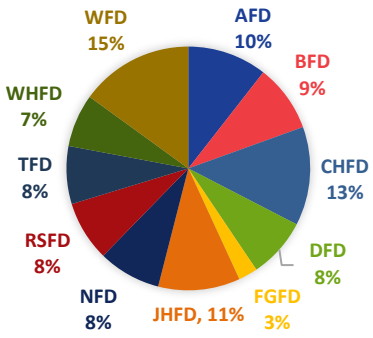
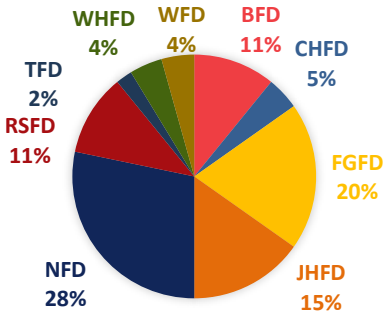


Figure 54: Rescue, 2018



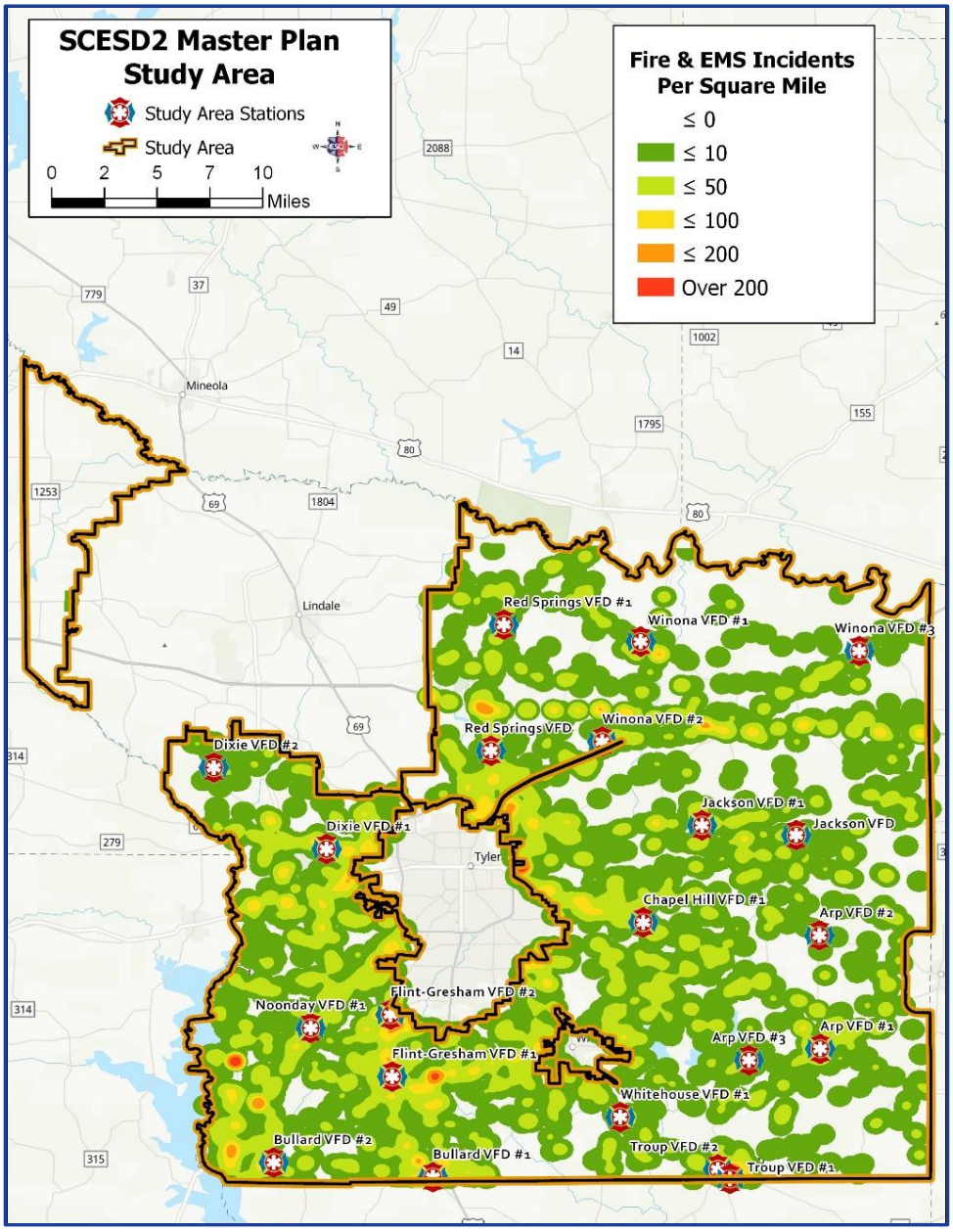
Note that information from both Arp VFD and Dixie VFD are missing from the rescue data. This appears to be an anomaly in the data and appears to be due to a lack of sufficient responses coded as rescue calls. This does not mean there were not calls of this type; it just means that ESCI was not able to determine if any calls existed, but were coded as a different incident type.

Geographic Service Demand

In addition to the temporal analysis, it is useful to examine the geographic distribution of service demand. Utilizing SC-ESD 2 data and GIS software, ESCI plotted incident locations to show the geographic service demand for both fire and EMS incidents from January 2016 to December 2017 throughout the service area. In the following figures, an incident density analysis was completed to determine "Hot Spots," or areas experiencing the highest level of service demand.

The next figure demonstrates the mathematical density of all incidents, summarized as incidents per square mile.

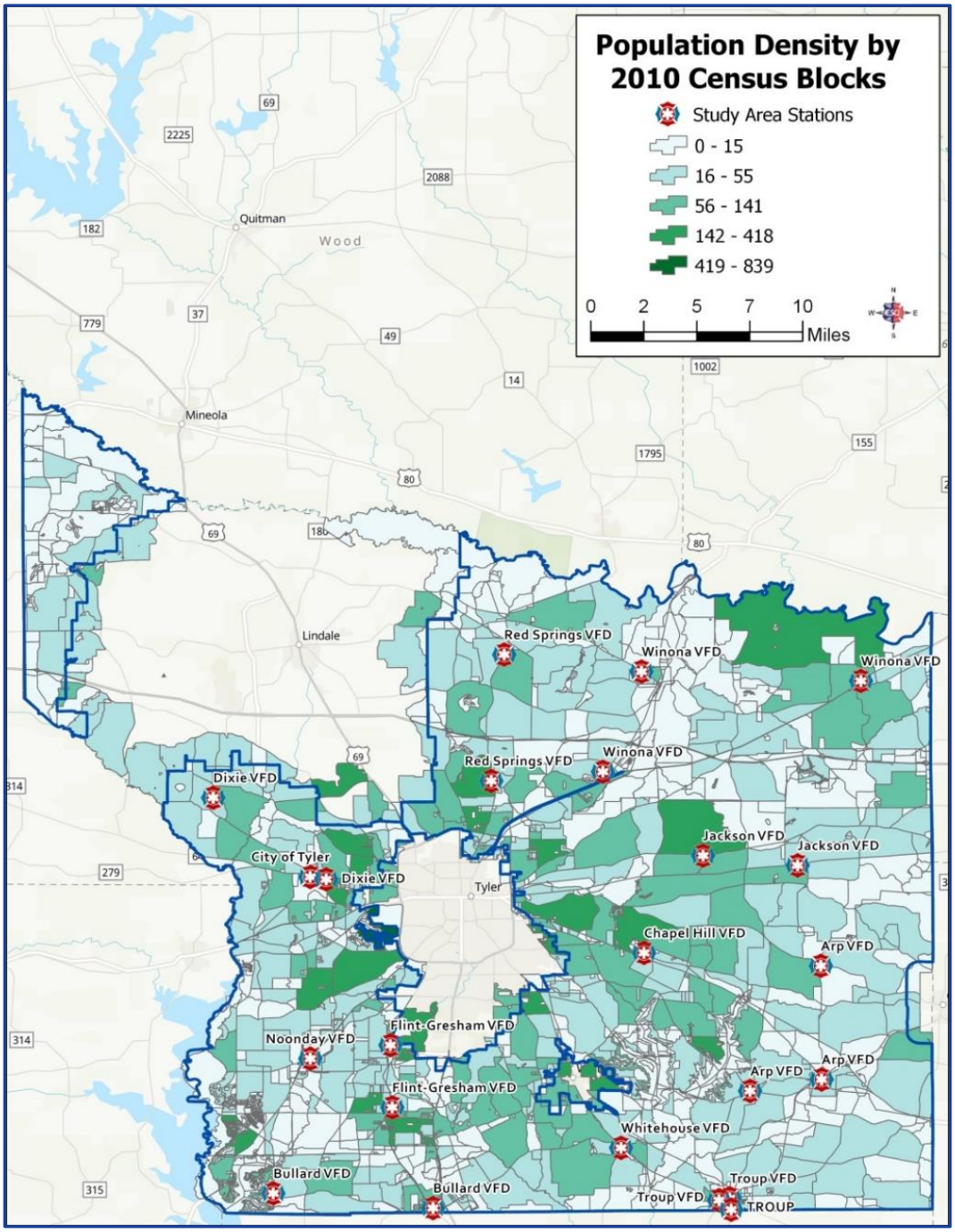
Figure 55: Incident Density (Hot Spot Analysis), January 1, 2017–December 19, 2018



Service demand is distributed widely throughout the SC-ESD 2's service area with a higher incident density located in the central region with incident density decreasing towards to outer regions with the exception of several pockets of increased density. The main area of increased density is geographically located around the City of Tyler. Both fire and EMS incidents are included in the preceding hot spot analysis.

As can be expected, areas of high incident density are typically linked to areas of higher population counts. The next figure illustrates the population density of the SC-ESD 2's service area as reported by the 2010 Census Bureau GIS data.

Figure 56: Population Density, 2010 U.S. Census Block Data

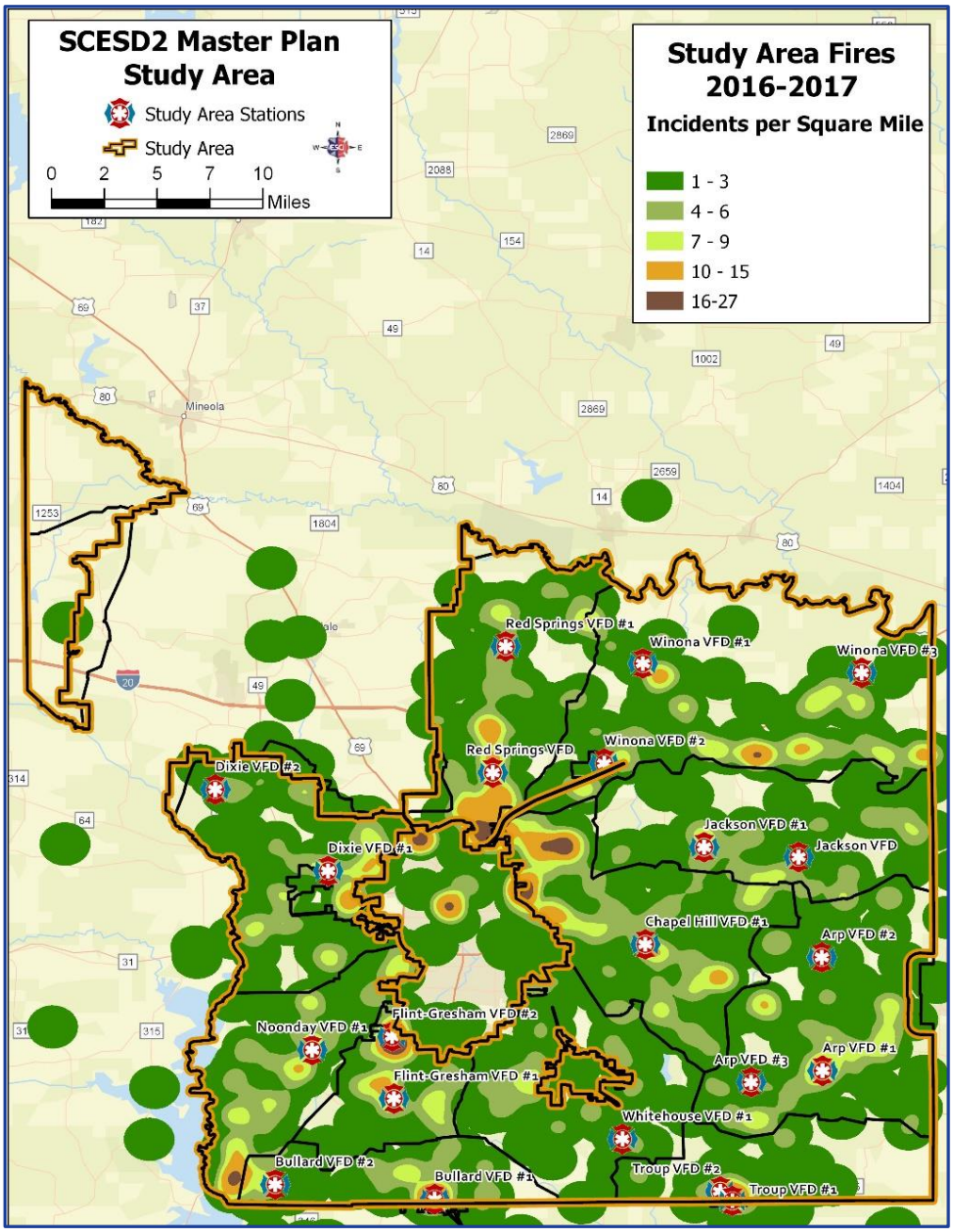


In the preceding figure, population density by census block utilizing the 2010 U.S. Census data is presented. In this figure, darker colors represent greater population densities and these areas can be refined to specific locations throughout the jurisdiction. Based on the previously stated assertion that service demand is linked to human activity, the identification of areas with a higher population density should result in accurate predictions of where areas of increased service demand will occur.

Fire Incidents

The following figure illustrates incidents categorized as fires in the NFIRS data summarized as incidents per square mile.

Figure 57: Fire Incident Density (Hot Spot Analysis), January 1, 2017–December 19, 2018

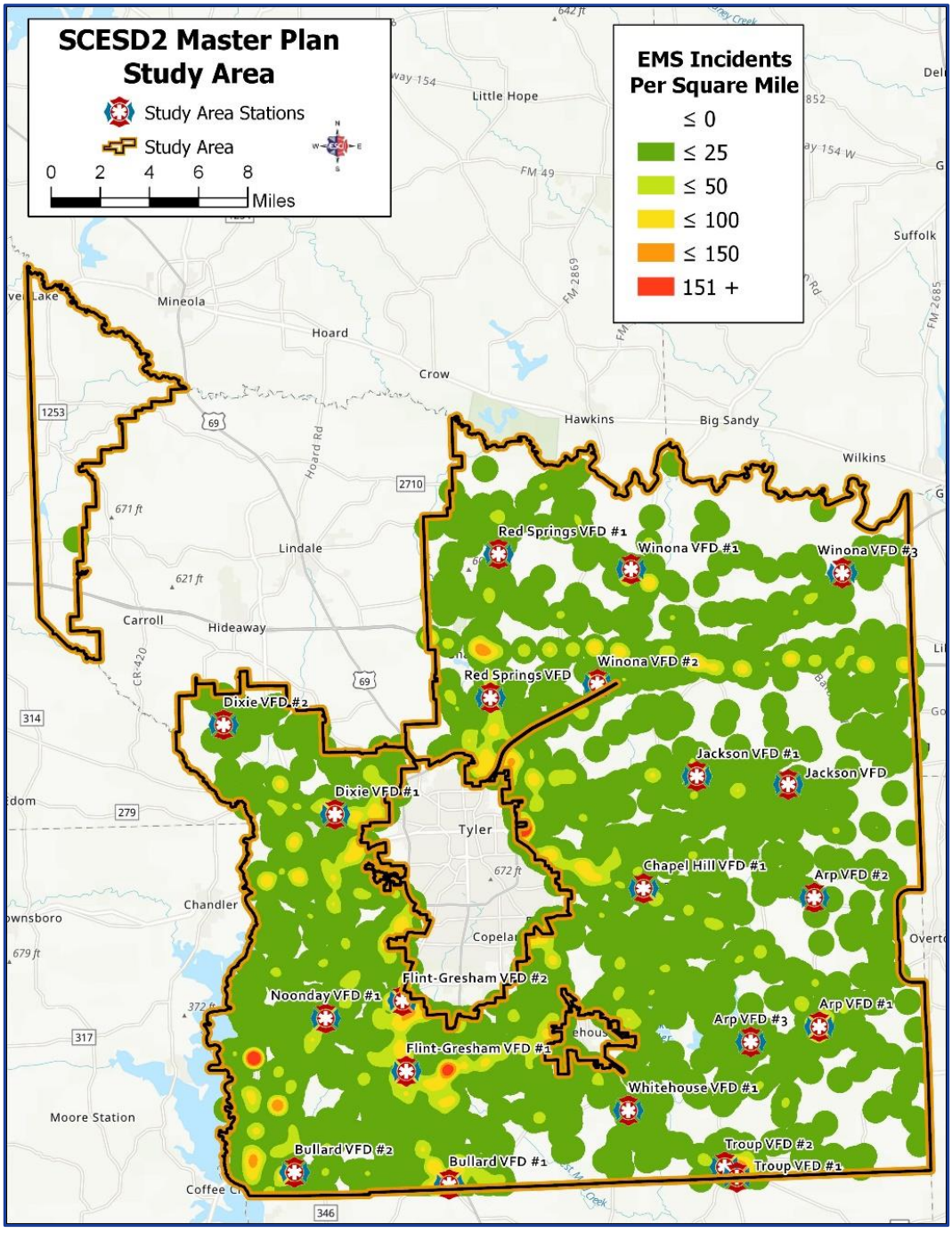


As illustrated in the preceding figure, fire incident service demand is distributed widely throughout the SCESD 2's service area with a higher incident density located in the central region with incident density decreasing towards to outer regions with the exception of several pockets of increased density. The main area of increased density is geographically located northeast of the City of Tyler.

EMS Incidents

The following figure illustrates the distribution of EMS incidents summarized as incidents per square mile.

Figure 58: EMS Incident Density (Hot Spot Analysis), January 1, 2017–December 19, 2018



Similar to the fire incident service demand, EMS incident service demand is also widely distributed throughout the SC-ESD 2's service area as illustrated in the preceding figure. Several pockets of higher incident density do appear especially in the geographic areas surrounding the City of Tyler.

Resource Distribution Analysis

In the distribution analysis, ESCI presents an overview of the current facility and apparatus deployment. GIS data is utilized to examine the distribution of resources in the SC-ESD 2 service area. To provide a benchmark for performance, two national performance standards will be utilized including the Insurance Services Office (ISO) criteria and the National Fire Protection Association (NFPA) standards. These are important standards for comparison purposes because, while ISO focuses on fire suppression capabilities for insurance purposes, NFPA standards establish a foundation for overall system benchmarking for fire suppression, rescue, and other activities fire departments could be required to perform. However, it is ultimately the citizens of SC-ESD 2's service area who must determine whether or not service delivery performance meets their expectations and if further improvements are required.

ISO Distribution

The Insurance Services Office (ISO), a subsidiary of Verisk Analytics, is a national data analytics provider that evaluates fire protection for communities across the country. ISO assesses all areas of fire protection as broken down into four major categories including emergency communications, fire department, water supply, and community risk reduction. Following an on-site evaluation, an ISO rating, or specifically, a Public Protection Classification (PPC®) number is assigned to the community ranging from 1 (best protection) to 10 (no protection). The PPC® score is developed using the Fire Suppression Rating Schedule (FSRS), which outlines sub-categories of each of the major four, detailing the specific requirements for each area of evaluation.

A communities ISO rating is an important factor when considering fire station and apparatus distribution and deployment due to its effect on the cost of fire insurance for the residents and business owners. The ability of a fire department to arrive on the scene of an incident equipped with personnel, equipment, and water sufficient to effectively mitigate a fire is a critical factor during an ISO evaluation. To determine whether or not a structure is eligible to receive a PPC rating better than 10, five road miles from a fire station measure is generally used. Typically, areas outside of five road miles may be subject to a split ISO rating if the fire department can demonstrate sufficient fire flow is available. In addition, to receive maximum credit for station and apparatus distribution, ISO evaluates the percentage of the community (contiguously built upon area) that is within specific distances of both engine/pumper companies (1.5 miles) and aerial/ladder apparatus (2.5 miles).

In addition, ISO also evaluates a community's availability of a sufficient water supply, critical for the extinguishment of fires. One of the areas evaluated in regard to the water supply is the geographical locations and distribution of fire hydrants. Based on ISO scoring, structures that sit outside of a 1,000-foot radius of a fire hydrant are subject to a Class 10 rating, signifying that no fire protection capabilities exist. Exceptions are made when a fire department can demonstrate that sufficient fire flow is able to maintain at a rate of 250 gallons per minute for 2 hours at a given property. This can be accomplished in a number of ways such as a dry hydrant, tanker shuttle operations, a storage tank, or drafting operations.

Regardless of the system or systems utilized, sufficient fire flow must be demonstrated.

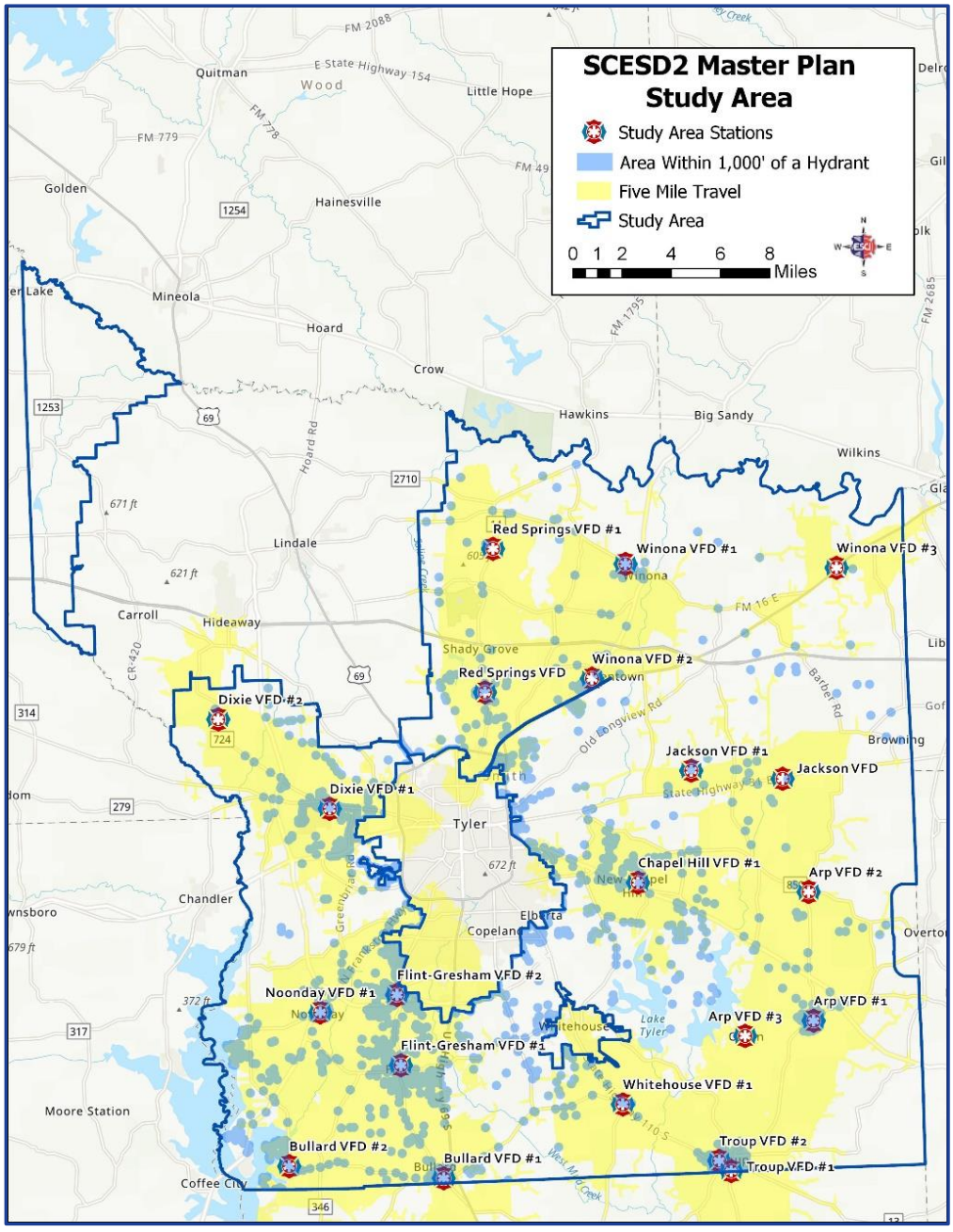
Each department maintains a separate ISO public protection classification (PPC®) for all properties located within the department service area and within five road miles of a fire station as shown in the following figure.[8] There has been some discussion about pursuing a single ISO PPC® classification for the entire District. ESCI strongly recommends this initiative be reviewed by an independent ISO study to determine the potential impact on District residents and businesses before any action to consolidate ISO classifications.

Figure 59: ISO PPC® Classification, 2009 vs 2015

Community	2009		2015	
	With Hydrant	No Hydrant	With Hydrant	No Hydrant
Arp VFD	7	9	3	6
Bullard VFD	6	9	3	5
Chapel Hill VFD	6	9	4	7
Dixie VFD	6	9	3	5
Flint-Gresham VFD	6	9	3	5
Jackson Heights VFD	9	10	5	5
Noonday VFD	7	9	4	4
Red Springs VFD	10	10	5	5
Troup VFD	7	9	3	6
Whitehouse VFD	6	9	4	4
Winona VFD	7	9	4	4

The next figure illustrates each station in SC-ESD 2's service area within a five-mile (by existing road) radius extending outward and the roadways within a 1,000-foot radius of a fire hydrant.

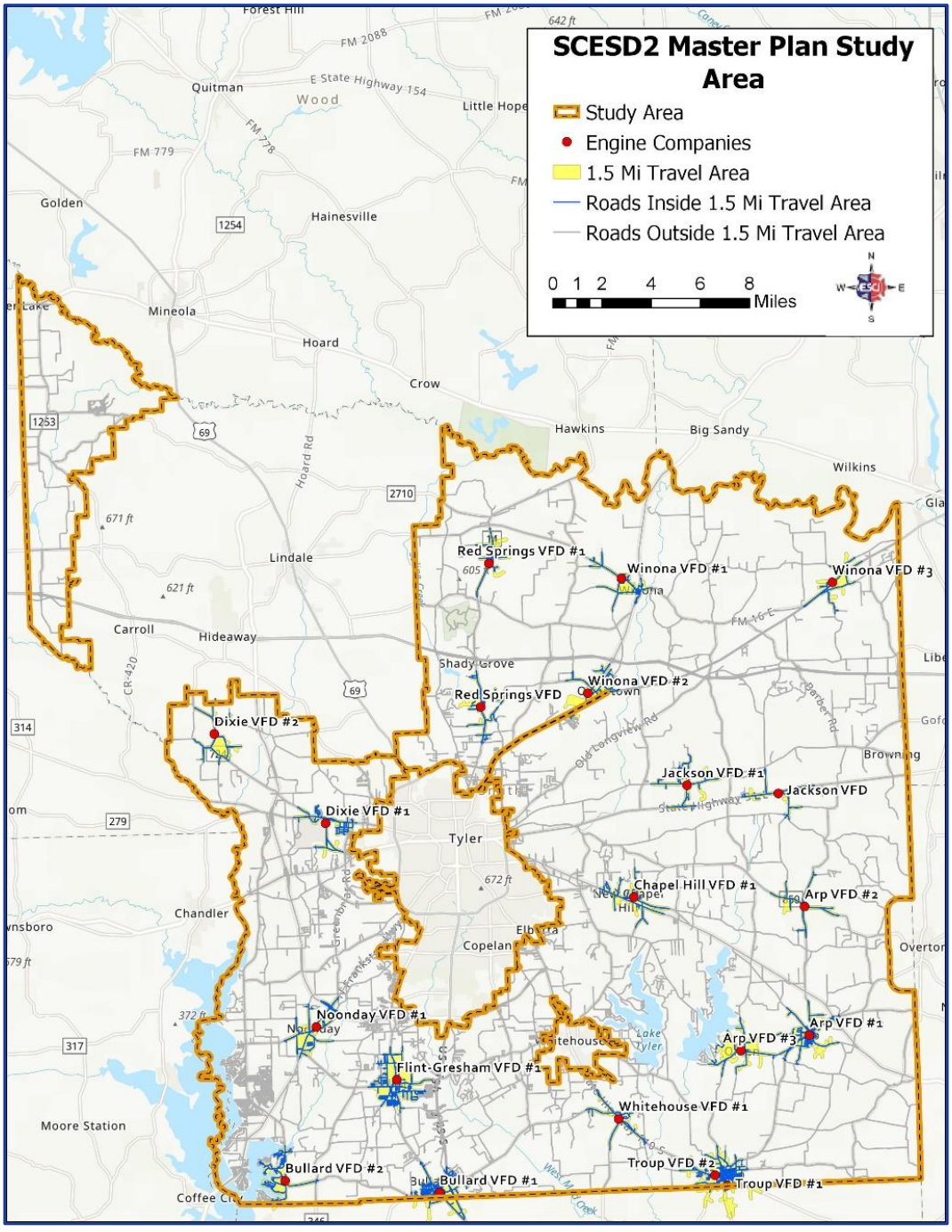
Figure 60: Study Area Station Distribution and Hydrant Distribution, 5-Mile and 1,000-Foot ISO Criteria



As illustrated in the preceding figure, many of the highly populated areas within the SC-ESD 2's service area fall within the five-mile travel requirement to receive a fire protection rating from ISO. Generally speaking, ISO is concerned with the provision of fire suppression services to contiguously built-upon areas within a service area. This means that ISO is unconcerned with the protection of unpopulated regions of a service area or those that lack permanent structures. If an area is determined to qualify for the minimum rating by ISO, the next evaluation of the service area examines whether or not an area qualifies for an improved rating. Water supply availability plays a role in this improved rating and the preceding figure illustrates the areas within SC-ESD 2's service area that fall within a 1,000-foot radius of a fire hydrant.

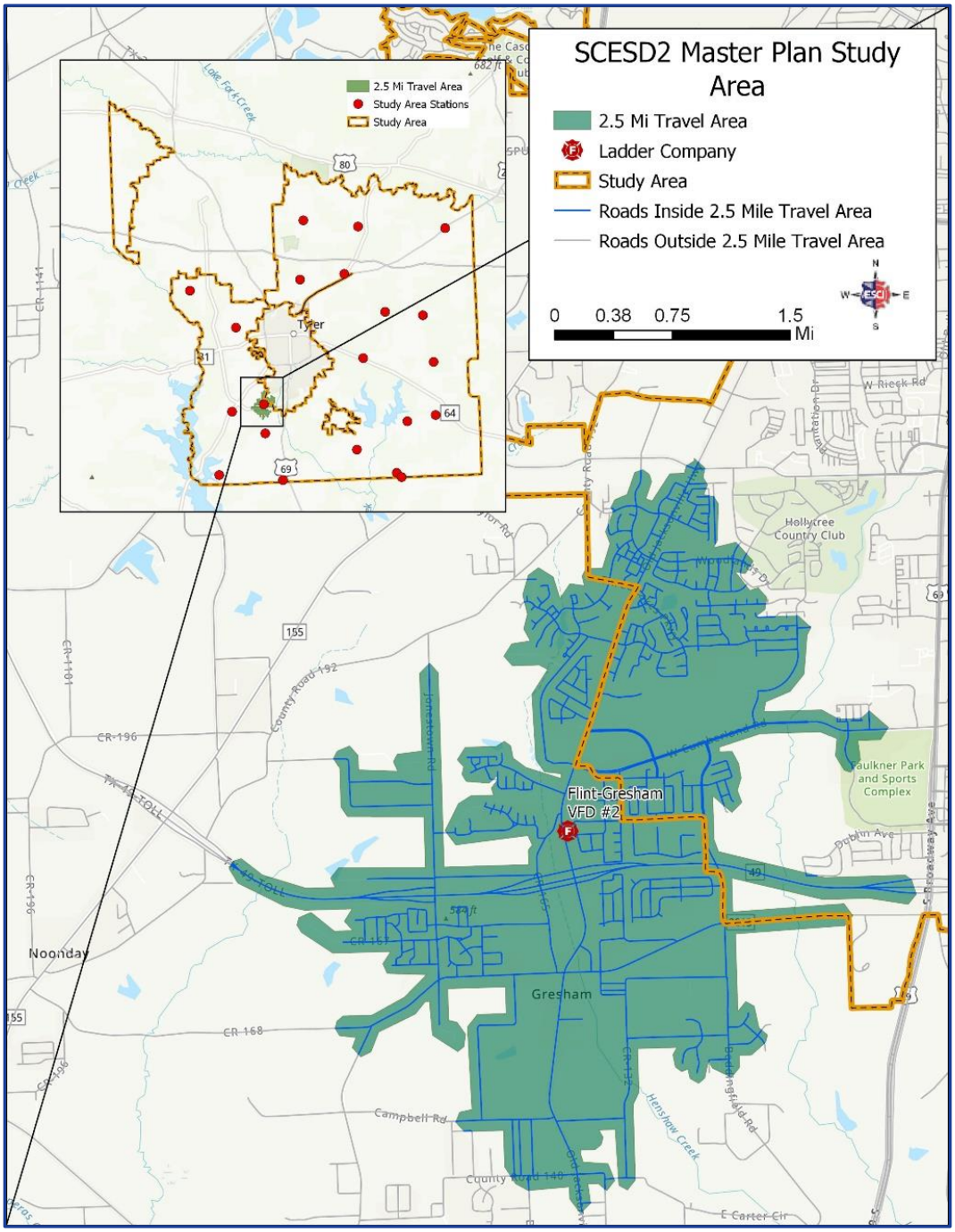
The following figure illustrates engine company distribution for SC-ESD 2's service area and the roadways within the ISO required 1.5 miles of travel distance.

Figure 61: Study Area Station Distribution, ISO 1.5-Mile Engine Company Criteria



The following figure illustrates the ladder company distribution for SC-ESD 2's service area and the roadways within the ISO required 2.5 miles of travel distance.

Figure 62: Study Area Station Distribution, ISO 2.5-Mile Ladder Company Criteria



NFPA 1720 Criteria

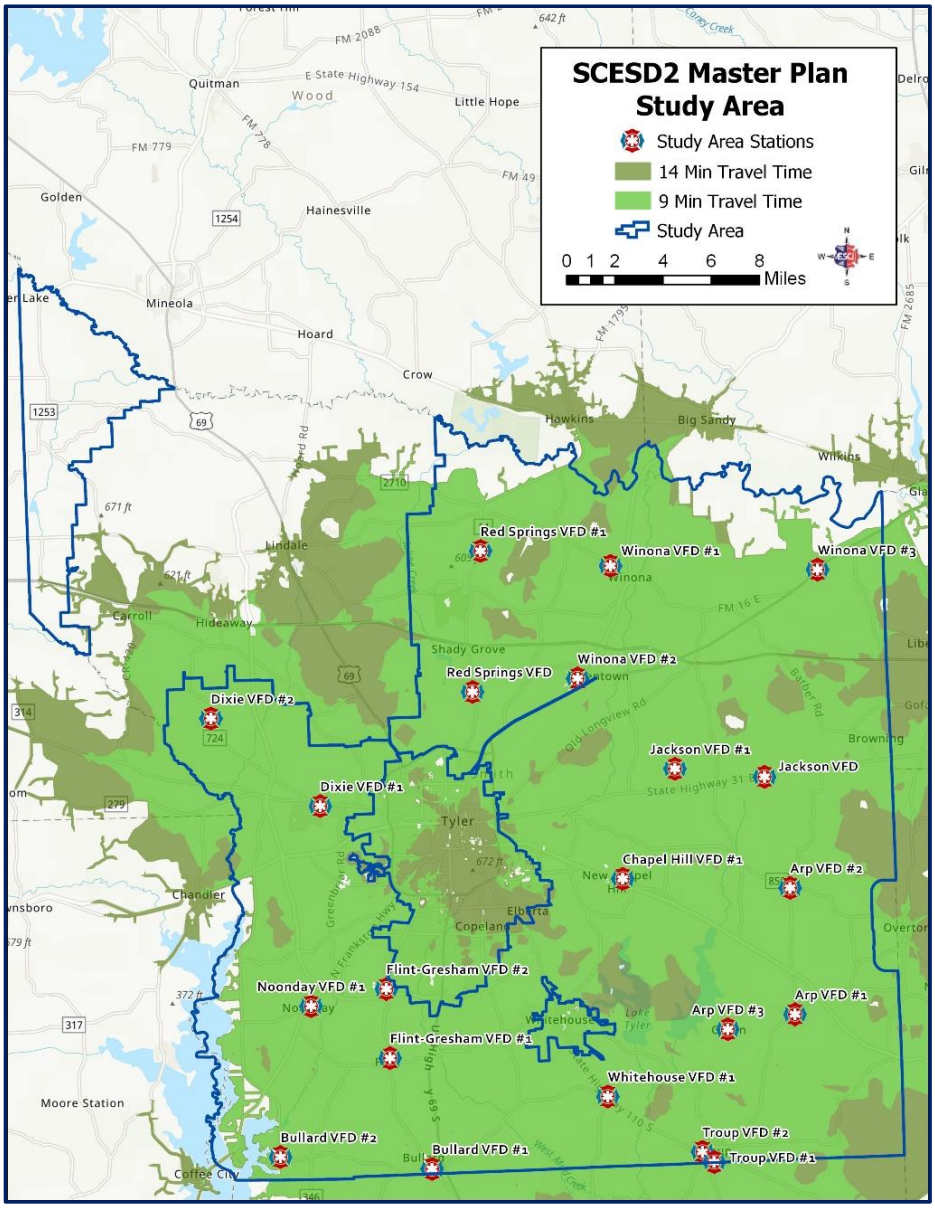
For combination departments with "substantially volunteer" staffing such as SC-ESD 2 that respond to a variety of service demand zones spanning different community demographics, the national consensus standard NFPA 1720 provides travel time goals for fire, EMS, and special operations emergency responses. NFPA 1720: *Standard for the Organization and Deployment of Fire Suppression, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments*, specifies that volunteer-staffed or combination-staffed fire departments deploy resources such that between 80 and 90 percent of emergency service demand can be reached between 9 minutes' and 14 minutes' travel time or less depending on the specific zone. The following figure illustrates the recommended deployment requirements based on demand zone and demographics.

Figure 63: NFPA 1720 Response Time Classifications

Demand Zone	Demographics	Response Time	Objective Percentage
Urban Area	> 1,000 population/mi^2	9 minutes	90%
Suburban Area	500–1,000 population/mi^2	10 minutes	80%
Rural Area	< 500 population/mi^2	14 minutes	80%

The following figure illustrates SC-ESD 2's travel time capabilities from the current volunteer-staffed and combination-staffed fire stations.

Figure 64: NFPA 1720 Deployment Analysis, 9 & 14 Minute Projected Travel



As illustrated in the preceding figure, a significant amount of SC-ESD 2's service area falls within the 9-minute travel time national response standard for urban area populations as outlined in NFPA 1720. When compared with the population density figure, a majority of the higher population areas meet this standard. The areas that fall outside of the 9-minute travel time standard, in large part, fall within the 14-minute standard for rural areas indicating appropriate station coverage overlaps.

It should be noted that the NFPA 1720 standard is not mandated or codified. However, it is an industry best practice and should be viewed as a desirable goal. Also, note that the travel time model does not measure actual travel time performance. The model demonstrates potential travel time assuming all apparatus are in quarters and available. Actual SC-ESD 2 response performance is discussed in the Performance Summary section of this report.

Resource Concentration Study

The following staffing schedule was used for this analysis:

Figure 65: Current Staffing

Community	Station	Staffing	Community	Station	Staffing
Arp	1	M–F 7a–4p	Noonday	1	24/7
Arp	2	M–F 9a–6p	Red Springs	1	M–F 8a–5p
Arp	3	Not Staffed	Red Springs	2	24/7
Bullard	1	M–F 6a–3p	Troup	1	M–F 8a–5p
Bullard	2	M–F 8a–5p	Troup	2	Not Staffed
Chapel Hill	1	M–F 8a–5p	Whitehouse	1	M–F 8a–5p
Dixie	1	M–F 7a–4p	Winona	1	M–F 6a–3p
Dixie	2	M–F 9a–6p	Winona	2	Not Staffed
Flint Gresham	1	M–F 9a–6p	Winona	3	M–F 8a–5p
Flint Gresham	2	Not Staffed			
Jackson Heights	1	Not Staffed			
Jackson Heights	2	M–F 8a–5p			

Response Reliability Assessment

The workload of emergency response units can be a factor in response time performance. If a response unit is unavailable for any reason, then a unit from a more distant station (or mutual/automatic aid department) must respond. This can obviously increase the overall response time. Although fire stations and units may be distributed in a manner to provide quick response, that level of performance can only be obtained when the response unit is available in its primary service area. Additionally, when multiple incidents, or concurrent calls, occur simultaneously it can create a strain on department resources and affect a jurisdiction's ability to muster sufficient resources to respond to additional emergencies.

Unit Hour Utilization

Unit hour utilization (UHU) is a calculation that measures productivity. Essentially, UHU describes the amount of time that a unit is not available for response because it is already committed to another incident. The larger the number, the greater its utilization and the less available it is for assignment to subsequent calls for service. A unit-hour (UH) is defined as one hour of service by a fully equipped unit available for dispatch or assigned to a call. A 24-hour unit consumes 8,760 hours annually. UHU rates are expressed as a percentage of the total hours in a year.

It is important to remember that individual unit workloads can often be greater than those experienced by the home station. This is because incidents such as structure fires will demand several units, as opposed to single-unit responses to other types of calls. Total hours include the time a unit was initially dispatched until the time that the unit cleared from the emergency scene.

Unit hour utilization is an important statistic to monitor for fire agencies using percentile-based performance standards, where performance is measured at the 80th or 90th percentile. UHU levels greater than 10 percent means that the response unit will not be able to provide an on-time response to its 90th percentile target, as it would only be available less than 90 percent of the time. As conditions change over time, so does the demand experienced by each unit and station.

The following figures display the total time SC-ESD 2 apparatus were committed to an incident from January 1, 2017, to December 19, 2018, according to the data provided. It should be noted that at the time of the report, information regarding call statistics for M101, M104, R101, EVAC 104, and LAR106 were not available and are not included in the UHU figure. Additionally, ESCI removed missing time values, invalid data, and outliers from the datasets, as well as all values in excess of one hour on all metrics. A total of 6,419 incidents were excluded.

Figure 66: Response, Committed, UHU Rates by Primary District, January 1, 2017–December 19, 2018

Primary District	Calls	Days in Service	Avg Response (Min)	Avg Committed (Min)	UHU
Arp	420 775	717 742	13:12 15:25	59:13 66:06	2.4% 4.73%
Bullard	625 1,192	717 742	12:15 12:37	40:58 50:15	2.5% 5.39%
Chapel Hill	829 1,228	717 742	14:34 15:59	53:09 62:00	4.3% 6.96%
Dixie	649 1,298	717 742	12:25 14:50	49:19 64:42	3.1% 7.61%
Flint-Gresham	725 1,394	717 742	9:11 12:18	48:16 60:50	3.4% 7.67%
Jackson Heights	364 967	717 742	14:15 18:17	62:09 77:16	2.2% 6.94%
Noonday	723 1,136	717 742	13:14 13:06	55:38 57:02	3.9% 5.83%
Red Springs	571 1,119	717 742	11:34 14:28	47:12 67:21	2.6% 6.96%
Troup	332 654	717 742	10:44 12:00	43:27 51:53	1.4% 3.10%
Whitehouse	573 1,048	717 742	10:31 14:21	50:06 60:40	2.8% 5.80%
Winona	715 1,654	717 742	14:21 17:38	72:25 69:47	5.0% 10.53%

The preceding figure illustrates that the average time SC-ESD 2 apparatus were committed to an incident over the study period was just over one hour (62 minutes). Overall, this indicates SC-ESD 2 apparatus operate at an average UHU of over six percent (6.5%) during the study period. The District with the highest utilization as defined by the number of responses, WIFD, had the highest UHU rate of over ten percent (10.53%). These results indicate that all suppression and support units should be statistically available for calls to meet 90th percentile objectives. UHU values are not the only measure of service demand, but also provide a perspective on the workload placed on the various individual units.

It is important to note that eight percent (576) of the 7,328 records that were analyzed had commit times exceeding 10 hours. These records were dropped from the analysis. Their inclusion pushed UHU rates up to as much as 40 percent. Further analysis is suggested to determine if these anomalies were due to data input errors or actual extended response times. It has been the experience of the study team that some incident types, *e.g.,* large wildland fires, incidents involving hazardous materials, and disaster-related incidents may have significantly long response times and additional planning may be required if extended incident time is a factor in unit utilization and availability. If this is the case, back-in assignments may need to be considered to prevent extended response times while those calls are in progress.

Concurrent Incidents

A second key indicator in assessing system reliability is call concurrency. Call concurrency examines the frequency of multiple calls occurring at the same time that units are still committed to a previous call. The higher number of calls that occur at the same time can drastically stretch available responses thus leading to extended response times from more distant resources. It should be noted that 3,630 incidents were excluded from this analysis due to missing data such as NFIRS incident type, incident number, or date/time.

In the following figure, ESCI examines 2017–2018 incidents for SC-ESD 2 to find the frequency that the jurisdiction is handling multiple calls.

Figure 67: Call Concurrency, January 1, 2017–December 19, 2018

Concurrent Incidents in Progress	Number of Incidents	Percent of Total Incidents
Single Incident	1,324	26.9%
Two Incidents	1,778	36.1%
Three Incidents	1,159	23.5%
Four Incidents	477	9.7%
Five Incidents	140	2.8%
More than Five Incidents	47	1.0%

On average during the two-year study period, single incidents accounted for slightly more than one out of every four incidents—almost 27 percent—for SC-ESD 2. Over 36 percent of the time, two incidents were occurring in SC-ESD 2's service area; which indicates that about 37 percent of the time, SC-ESD 2 is responding to three or more incidents at the same time, thus reducing its available resources. This suggests the need for additional staffed units if funding is available.

Response Performance Summary

In the performance analysis, emergency incident response time performance within the SC-ESD 2 service area was examined. The data used for this analysis came from two separate data sets, one to calculate turnout time and travel and the other to calculate all other metrics within this report. The dataset used for turnout and travel was a combination of multiple other datasets that were combined to calculate those turnout and travel metrics and covered a date range from January 1, 2017, through December 31, 2018. The other data, or main dataset, was extracted from SC-ESD 2 Computer-Aided Dispatch (CAD) records and the department's Records Management System (RMS) and covered a date range from January 1, 2017, through December 19, 2018. Mutual aid incidents outside the study area, data outliers, and invalid data were removed from the data set whenever possible.

In analyzing response performance, percentile measurements of SC-ESD 2 were calculated. The use of percentile calculations for response performance follows industry best practices and is considered a more accurate measure of performance than "average" calculations. Commonly, the "average" measure is used as a descriptive statistic also called the mean of a data set. The reason not to use averages for performance standards is due to the fact that they may not accurately reflect the performance for the entire data set and may be skewed by data outliers. One particularly good or bad value could skew the average for the entire set. Percentile measurements are a better measure of performance since they show that most of the data set has achieved a particular level of performance.

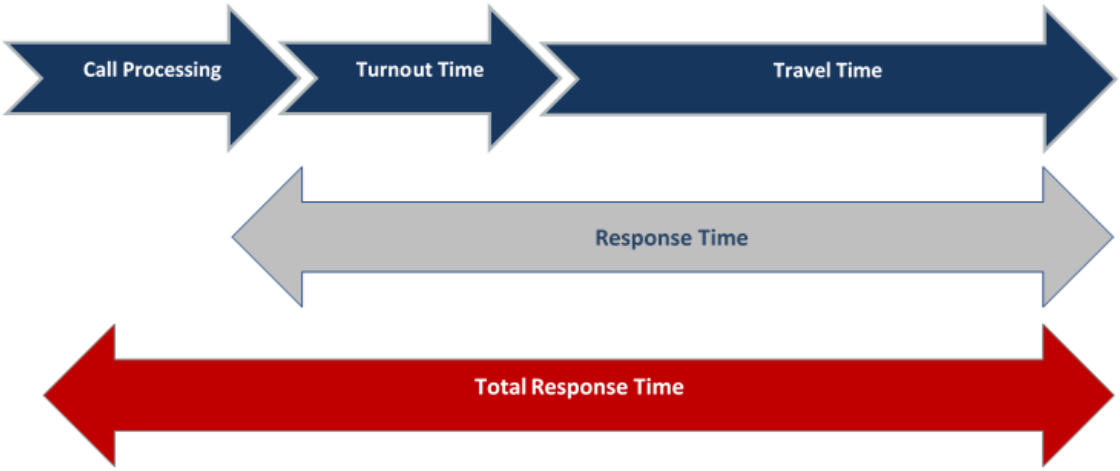
Fire service best practice documents such as the Center for Public Safety Excellence (CPSE) *Community Risk Assessment: Standards of Cover, 6th Edition* and the National Fire Protection Association (NFPA) 1720: *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer and Combination Fire Departments* and NFPA 1710: *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments* recommend measuring fractile emergency response time performance. For example, performance measured at the 80th percentile means that 90 percent of emergency responses occur at that stated value or less. In basic terms, the 80th percentile means that 20 percent of the values are greater than the value stated, and all other data is at or below this level. This can then be compared to the desired performance objective to determine the degree of success in achieving the goal.

Industry best practices recommend measuring response performance from the time the emergency call is received at the dispatch center to the arrival of the first fire department apparatus. Tracking the individual components of the total response time allows for identifying deficiencies and areas for improvement. It is also important to note that each of the components of response performance are not cumulative. Each is analyzed as an individual component.

The response time continuum, the time between when the caller dials 911 and when assistance arrives, is comprised of several components. The following are the individual components typically analyzed by ESCI.

- Call Processing Time—The amount of time between when a dispatcher answers the 911 call and resources are dispatched.
- Turnout Time—The time interval between when units are notified of the incident and when the apparatus are responding.
- Travel Time—The amount of time the responding unit spends on the road to the incident.
- Response Time—A combination of turnout time and travel time. This is the most commonly used measure of fire department response performance.
- Total Response Time—Total Response Time equals the combination of "Processing Time," "Turnout Time," and "Travel Time."

Figure 68: Measurable Performance Time Components



It is important to note that the unavailability of some data markers from SC-ESD 2 prevented ESCI from including the entire data set in the response analysis. There was no documentation of call processing time provided so that metric was omitted entirely. Additionally, some incidents were missing time values or included invalid data. A small number of outliers with all values in excess of one hour on one or more metrics were excluded from the analysis. All told, ESCI was able to use the following information in this analysis:

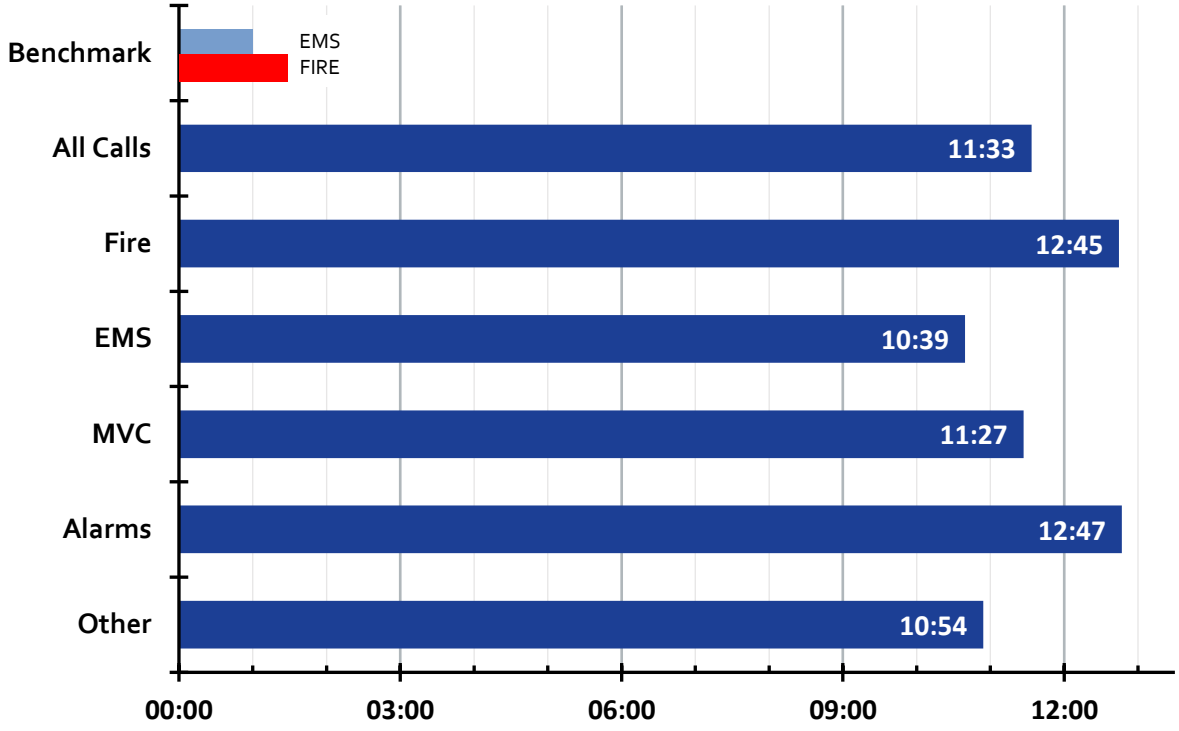
- Turnout time—5,812 incidents; 82% of incidents with valid incident number and NFIRS type.
- Travel time—6,922 incidents; 98% of incidents with valid incident number and NFIRS type.
- Response time—6,555 incidents; 93% of incidents with valid incident number and NFIRS type.

Turnout Time Performance

After call processing, the second component of the response continuum, and one that is directly affected by response personnel is turnout time. Turnout is the time it takes personnel to receive the dispatch information, move to the appropriate apparatus, and begin responding to the incident.

NFPA 1720 allows the authority having jurisdiction (AHJ) to determine staffing and response objectives, therefore does not provide a benchmark for turnout time unless the fire station is staffed. NFPA 1720 suggests that staffed stations have a turnout time of 60 seconds or less at the 90th percentile for EMS calls and 90 seconds or less at the 90th percentile for fire calls.

Figure 69: Turnout Time at 90th Percentile, January 1, 2017–December 31, 2018



Overall turnout time performance for SC-ESD 2 is 11 minutes, 33 seconds, for all emergency calls at the 90th percentile. Staffing additional fire stations and tracking this metric for staffed, unstaffed, and systemwide performance will be critical in the future as growth and development occur within the ESD. Current limitations on how call metrics, such as time received by the communications center and enroute time by the units, as well as accurate classification of the call within the RMS system, make it difficult to accurately calculate turnout time. SC-ESD 2 should examine available options that will make this data easier to calculate and validate.

Travel Time Performance

Travel time performance is measured from when the unit begins its response, or goes enroute, and ends when the unit arrives on the scene of an incident. This performance benchmark is unaffected by the type of organization, volunteer, combination, or career, and performance cannot typically be improved by the individual units. Travel time is typically the longest component of total response time. The location of the fire stations and the distance apparatus must travel to reach an emergency, influences response time the most. The quality and connectivity of streets, traffic, and geography are also factors. NFPA 1720 does not provide a travel time standard for volunteer and combination departments.

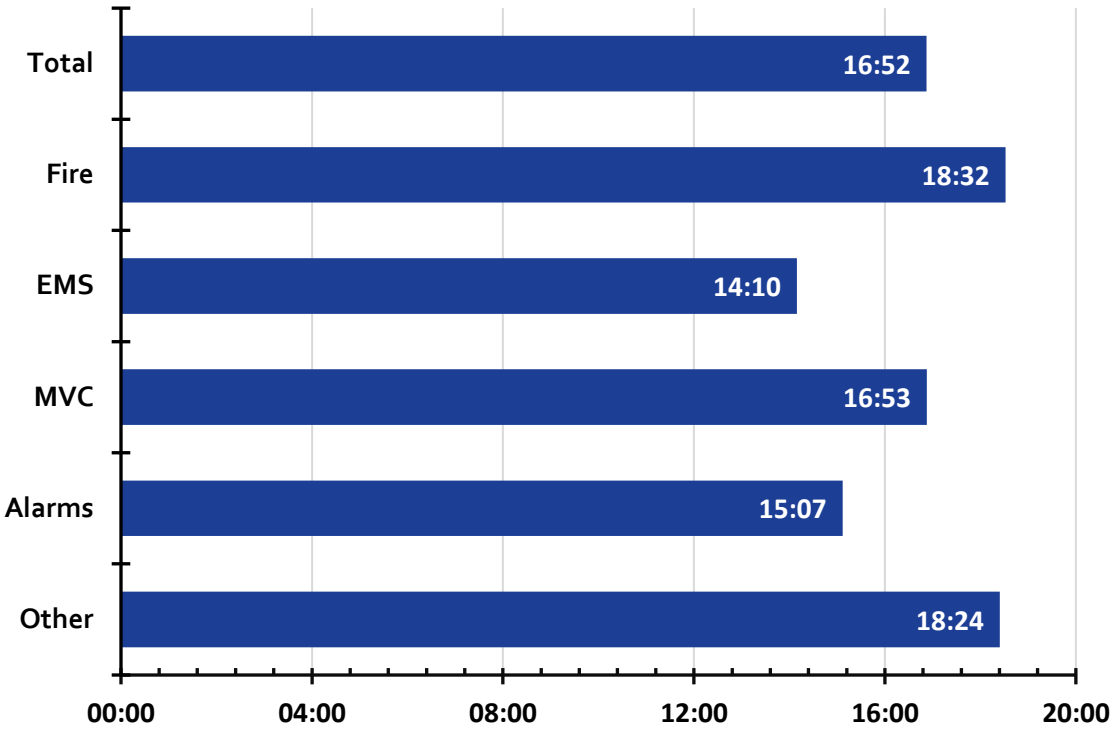
When the travel time performance of SC-ESD 2 is examined, it is clear that citizens should anticipate extended response times when calls for service are requested. When compared to the career fire department standard, performance for all types of emergency calls are over four times greater than the standard. Although each metric represents its own set of data and therefore cannot be simply added together, a review of the information presented thus far indicates that the next metric, response performance, will most likely exceed NFPA 1720 criteria for performance.

Response Time Performance

In rural demand zones, NFPA 1720 calls for a response time of 14 minutes from the time of notification to the arrival of the first arriving unit to an emergency incident (measured at the 80th percentile). For the suburban demand zones, NFPA requires a response time of 10 minutes measured at the 80th percentile. As discussed above, NFPA 1720 does not provide a separate travel time, only the response time benchmark. The CPSE/CFAI *Standards of Cover*, *6th Edition* offers guidelines for performance objectives based on population density, service demand, community risk, and current baseline response performance.

In Chapter 4, Section 4.4.2 Annual Evaluations, NFPA 1720 calls for annual evaluations of service delivery performance for each of the demand zones within the jurisdiction of the fire department. The following two figures display response time performance calculated at the 80th percentile as described by NFPA 1720, as well as the 90th percentile to serve as a comparison.

Figure 70: Response Time at 80th Percentile, January 1, 2017–December 19, 2018



When response performance is examined at the 80th percentile, SC-ESD 2 exceeds NFPA 1720 requirements for all types of incidents as well as overall performance. This suggests that the department does not possess a sufficient number of fire stations to adequately meet demand, that current fire stations are not located where demand is occurring, or that too few staffed fire stations exist within the system. SC-ESD 2 should consider optimizing fire station locations where possible, consider adding additional career staffing at key locations or potentially adding additional stations to the system.

Total Response Performance

The final component within the continuum is total response performance which measures the time from when the emergency call was answered at the communications center until the first unit arrived on the scene. Since call processing data was not available at the time of the report, this metric was not included.

Mutual and Automatic Aid Systems

With the creation of SC-ESD 2, the combined resources of 11 volunteer departments have resulted in an increase in resources and depth in emergency responses. The District has established mutual and automatic aid agreements with the majority of perimeter departments. An opportunity exists in two regions. The first is with the City of Tyler. SC-ESD 2 has an informal mutual aid agreement; however, the City of Tyler is currently asking for a charge for a service agreement. It is in the best interest of both departments to formally agree to an automatic aid agreement or follow the State of Texas 12-hour mutual aid.

Another opportunity relates to the City of Whitehouse. Whitehouse Fire Department (WHFD) provides automatic aid only for structure fires. Due to this limited agreement and based on run data, SC-ESD 2 has an average response time in the northern part of Whitehouse Volunteer Fire Department (WHVFD) of 12 minutes. Although this is not a significant delay, there are numerous occasions where WHVFD actually drives through the City of Whitehouse to get to a call in the northern part of the SC-ESD 2 response area. ESCI recommends increased effort in developing a closest unit response model for the City of Whitehouse and WHVFD. The following figure shows the breakdown of mutual and automatic aid for 2018.

Figure 71: Mutual and Automatic Aid, 2018

Jurisdiction	Automatic Aid Given	Automatic Aid Received	Mutual Aid Given	Mutual Aid Received
Chandler	–	–	4	–
Gladewater	1	–	16	5
Henderson	–	–	1	–
Jacksonville	–	–	5	–
Kilgore	1	–	6	5
Liberty City	–	–	–	1
Lindale	1	1	6	3
Mixon	–	–	2	–
New London	–	–	1	–
New Somerfield	–	–	1	–
Overton	5	2	7	2

The best use of mutual and automatic aid is dependent on the departments working well together. To be most effective, the following should be considered:

- Fireground operations should be conducted in a similar manner and should be based on common Standard Operating Guidelines.
- Firefighters should work in concert with personnel for another agency, based on common training programs and procedures.
- Dispatch procedures should be in place that clearly define which response types and locations are to receive Automatic Aid response.
- Procedures for the request of and provision of mutual aid should be clearly established in the Mutual Aid Agreement.
- Personnel should be fully trained on mutual and automatic aid practices and remain informed on changes.

SUPPORT PROGRAMS

Training

Providing safe and effective fire and emergency services requires a well-trained workforce. Training and education of personnel are critical functions for Smith County Emergency Services District No. 2. Without quality, comprehensive training programs, emergency outcomes are compromised, and emergency personnel are at risk.

Initial training of newly hired firefighters is essential, requiring a structured recruit training and testing process. Beyond introductory training, personnel need to be actively engaged on a regular basis and tested regularly to ensure skills and proficiencies are maintained. To accomplish this task, agencies must either have sufficient instructors within their own organization or be able to access those resources elsewhere. Training sessions should be formal, frequent, and consistent while following prescribed lesson plans that meet specific objectives. In addition, a Safety Officer should be dedicated to all training sessions that involve manipulative exercises.

In the following pages, ESCI reviews SC-ESD 2's training practices and compares them to national standards and best practices, and recommends modifications, where appropriate. Specific information for SC-ESD 2 was provided by staff, ESCI field visits, or from the 2017 ESCI *Agency Analysis and Equity Analysis* for SC-ESD 2.

General Training Competencies

For a training program to be effective and efficient, it should be based on established standards. The National Fire Protection Association (NFPA) provides several documents in this regard including NFPA 1001: *Standard for Fire Fighter Professional Qualifications*, and NFPA 1410: *Standard on Training for Emergency Scene Operations.* In addition, the Texas Commission on Fire Protection (TCFP) provides certification and regulation of fire departments within the state including personnel and training facilities.

While no incident command certification levels of personnel were defined or identified by SC-ESD 2, it was noted in the 2017 report that NIMS 100, 200, and 700 were present with some officers holding 300 and 400 certifications. From a training evolution safety perspective, accountability procedures are in place along with the presence of an Incident Safety Officer (ISO) at all training events. New hires to SC-ESD 2 receive their pre-employment training from external recruit academies based on TCFP requirements. Once hired, SC-ESD 2 personnel are not trained in specialized rescue operations due to the utilization of regional response teams. Some personnel, however, are trained to Technician 1 and 2 levels for vehicle extrication. In regard to hazardous materials response, SC-ESD 2 has trained all personnel to the Operations level with some obtaining Technician level. Wildland firefighting certifications (S-130 & S-190) have also been obtained by some personnel.

Paramedic and Emergency Medical Training is accomplished through online providers and regionally by UT Health EMS, Kilgore College, Tyler Junior College, and supplemented by the training division.

Training Administration

To function efficiently and effectively, a training program needs to be managed. Administrative program support is vital to program success and at times suffers due to budgetary constraints or competing organizational priorities. An additional element of effective administration is the development of program guidance in the form of training planning, goals, and defined objectives. These goals and objectives should be clearly communicated to all levels of the organization for program awareness, input, feedback, and support. While challenging in any organization, consistent messaging across the 11 separate departments of SC-ESD 2 is critical to success.

SC-ESD 2 utilizes a Battalion Chief to administer its fire and EMS training program. It was not identified if any other, or how many others, positions are funded specifically for fire and EMS training. However, the total annual operating budget for training is $59,000. From both safety and quality perspectives, SC-ESD 2 utilizes certified instructors in most training evolutions. At times, outside vendors or personnel who have extensive knowledge and expertise on specific subjects are utilized to complete training. Overall, it was indicated that management does "somewhat" place a priority on department training.

Training Schedules

To be able to deliver efficient and effective training to fire and EMS personnel, some resources are necessary to arm the trainer with the tools needed to provide adequate educational content. In addition to tools, effective methodologies must be employed if delivery is to be sufficient to meet needs. This can be challenging in a department such as SC-ESD 2 that is made up of 11 separate departments with predominantly autonomous training programs.

Training Program Planning

A structured program planning process is a critical element to any training program. To be fully efficient and effective, training delivery should be based on:

- Periodic training needs assessments.
- Defined annual program goals, based on a needs assessment.
- Specific delivery objectives, addressing program goals.
- A process of performance measuring and monitoring.
- Periodic re-evaluation and modification.

It is recommended that an annual training plan be developed based on the preceding criteria including clearly defined program goals and objectives.

Training Facilities

It was noted by ESCI that SC-ESD 2 does not currently have a dedicated training facility. However, SC-ESD 2 does have access to several training facilities in the area including a cooperative agreement with Smith County Emergency Services District No. 1 to utilize their facility, especially for live-fire training evolutions. Unfortunately, like with most joint facilities such as this, it was noted that availability and scheduling can become a challenge.

ESCI considers the need for a quality training facility to be a high priority for any agency that currently lacks this resource. It should be noted that construction of a modern, centralized training facility that complies with industry standards, such as NFPA 1402: *Guide to Building Fire Service Training Centers*, of having classrooms, practice grounds, training tower, live-fire building, and training props is a significant capital investment. In addition, the on-going cost of operating and maintaining a training facility should also be considered. While many agencies utilize a regional approach with neighboring departments to accomplish this need, it does provide issues such as with scheduling as previously noted by SC-ESD 2.

Training Procedures, Manuals, and Protocols

A department's training manual, procedures, and protocols are the foundation upon which the delivery of educational content is based. In the absence of this kind of document, personnel will tend to train however each individual decides rather than in a manner that is consistent with the department's established operational practices and standards. Development and adherence to these documents are critical for any successful training program.

Training Delivery Methodology: Competency-Based Training

The industry standard for the amount of training delivered is typically based on contact hours. The fundamental objective is to deliver 240 hours of training annually per firefighter, a measure used by the Insurance Services Office (ISO) for purposes of fire department ratings. Other minimums are in place including those related to state certification maintenance and specialized functions such as driver training, officer training, and hazardous materials response training.

An hours-based approach is appropriate and generally effective. However, the shortcoming of the methodology is that sometimes training will be delivered simply to meet minimum hour requirements when, in fact, the individuals receiving the training are already fully versed in the subject matter. Time in this instance would be better spent by 1) subjecting the students to a skills performance demonstration; and 2) once competency in the skill area is demonstrated, use the remaining time to address new skills or subject areas.

Under a competency-based system, an evaluation of skill performance is conducted at scheduled intervals to determine if the person evaluated can perform the tasks in accordance with pre-determined standards. Those skills that are performed well require no additional training. Those skills not performed well are practiced until the standard is met. This approach maximizes the time used for effective training. Further, it ensures that members are performing at an established level. Specialty skills can be evaluated in the same manner with further training provided as needed. Ideally, the competency-based training approach is used on an ongoing basis. For example, each quarter different skills are evaluated on an individual basis.

To institute a competency-based approach to training, all of the department's established and needed skills must be documented to describe the standard of performance expected. This would include all skills such as hose handling, apparatus operation, EMS procedures and protocols, use of equipment and tools, forcible entry, ventilation, tactics and strategy, and others.

Training Records

It has been noted that SC-ESD 2 lacks a centralized process for compiling training records from the associated 11 separate fire departments. Due to this lack of centralization, it is difficult to complete an accurate record of training statistics for the entire organization. This information is critical for providing an overall evaluation of the organizations training program and also becomes valuable when an agency is undergoing a review by ISO. In regard to training reports and records, it is recommended that any program follow the guidelines set in NFPA 1401: *Recommended Practices for Fire Service Training Reports and Records*.

SC-ESD 2 maintains individual training files for all personnel which are the responsibility of the Captains and Battalion Chiefs. Entry for these records can be accomplished by the individual themselves, Captains, or the Battalion Chiefs. Each individual has access to their personal file which would include any certifications including fire and EMS. Currently, daily training records and training equipment inventories are not completed. In addition, the total amount of personnel training on an annual basis and the total hours of delivered annual training is not maintained by SC-ESD 2.

Life Safety Services (Fire Prevention)

All of the life safety services functions listed below are handled by the Smith County Fire Marshal's Office:

- Code enforcement activities
- New construction involvement and inspection
- General inspection program
- Fire/Life-Safety public education programs
- Fire investigation programs
- Pre-incident planning
- Statistical collection and analysis

OVERVIEW OF COMMUNITY RISK FACTORS AND DEMOGRAPHICS

Community Risk Factors

As can be expected, Smith County is susceptible and vulnerable to a variety of risks. In this section, ESCI provides a Community Risk Assessment in an effort to evaluate these community risks and the overall potential risks that are present within the service area. These risks are identified in order to assist Smith County in planning where to locate response resources in the types and numbers necessary to effectively respond to and mitigate likely emergencies. While impossible to consider all hazards that are possible for all individual occupancies within Smith County, the study does evaluate the potential general risks that seem to be relevant to the study area. It is recommended that all agencies be aware of the frequency and severity of the potential hazards that could occur within their jurisdiction.

This section was completed utilizing information and data provided to ESCI by Smith County along with additional research on the study area. Specifically, the Smith County 2018 Hazard Mitigation Plan developed for the Smith County Fire Marshal's Emergency Management Office was evaluated for historical and potential hazards and risk factors within the study area.

The next figure serves as a sample method in which communities can identify and analyze risks within their community. This specific example is utilized by the United States Fire Administration's National Fire Academy.

Figure 72: Risk Identification and Analysis Process

Step	Action
Hazard Identification	Identify hazards.
	What is the probability this hazard will occur?
	Is this hazard a significant threat to your jurisdiction?
	Approximately how often does this hazard occur in your jurisdiction?
Vulnerability Assessment	For each hazard identified in the hazard identification process, consider each of the five factors. Factor 1: Danger/Destruction/Personal harm Factor 2: Economic Impacts Factor 3: Environmental impacts Factor 4: Social Impacts Factor 5: Political considerations
	Score the vulnerability of this hazard.
	Reconsider the priority of each hazard based on vulnerability.
Risk Rating Score	Risk Rating = Probability[1] X Vulnerability[1]

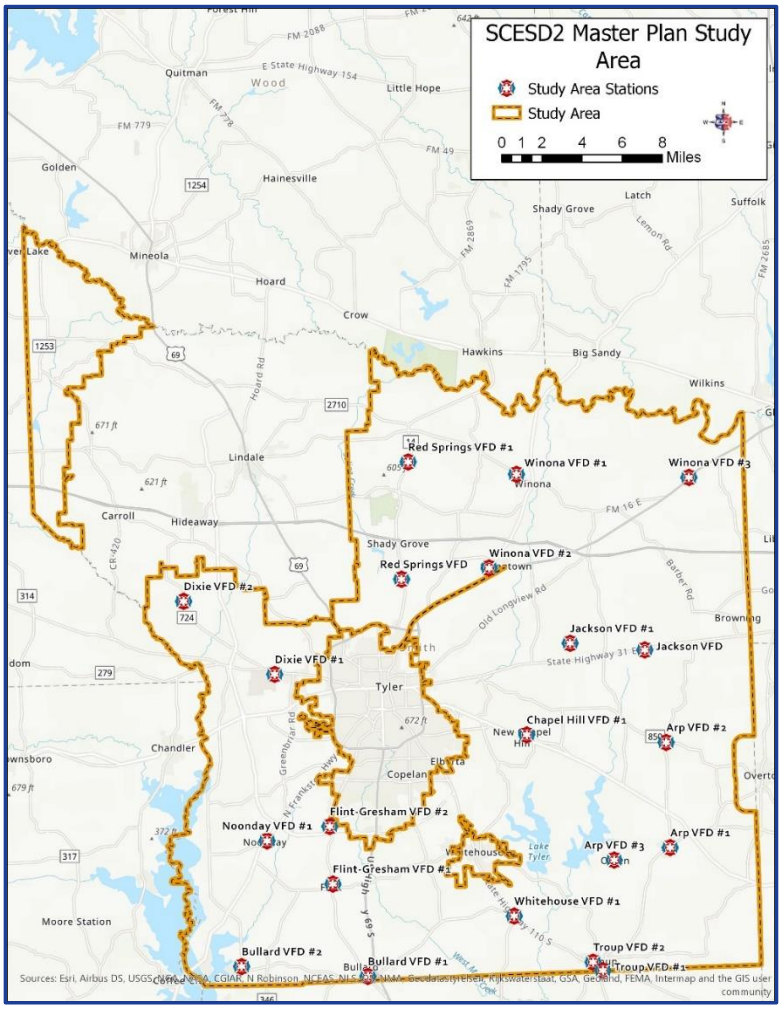
[1] Probability and Vulnerability are rated as 3 = High, 2 = Moderate, 1 = Low

The fire service process illustrated in the preceding figure takes several factors in mind when evaluating properties. These factors include the service area population and population density, the demographics of the population, local land use and development, and the geography and natural risks present within the community. The identification and analyzation of these factors affect the number and type of resources (both personnel and apparatus) necessary to mitigate an emergency incident. As should be expected, properties with high fire and life risk would often require a greater number of personnel and apparatus. Therefore, staffing and deployment decisions should be made utilizing all available data along with consideration to the level of risk within geographic sub-areas of a community.

Overall Geospatial Characteristics

Smith County is located geographically in East Texas approximately 100 miles east of the Dallas-Ft. Worth metro area. According to the U.S. Census Bureau, Smith County consists of approximately 950 square miles of total area with 921.5 square miles of land and 28.3 square miles of water. The cities of Arp, Bullard, Hideaway, Lindale, New Chapel Hill, Noonday, Troup, Tyler, Whitehouse, and Winona lie within the borders of the District; however, most of the service area is rural in nature as indicated in the following figure.

Figure 73: SC-ESD 2 Service Area



As the community risk assessment continues, it is important to anticipate potential fire risk with a consideration of existing land use, future development, and intended land use. Recent research suggests that relative risk may be grouped by occupancy type and land use and shown in Figure 74.[9]

Figure 74: Relative Risk by Occupancy Type and Intended Use

Occupancy Risk Classification	Examples
High-Risk Occupancy	• Assembly • Educational • Health care, detention, and correctional • Manufacturing, processing of combustible or hazardous materials • Mercantile and mixed-use (big box or high-rise) • Residential, hotel/motel and dormitory • Residential, multi-family and large room and board • Storage, high-pile, and combustibles
Moderate-Risk Occupancy	• Mercantile/business, small mid-rise • Residential, single family, small board, and care • Manufacturing, processing of non-combustibles, non-hazardous • Storage, small or non-combustibles
Low-Risk Occupancy	• Scattered small businesses and industrial occupancies, single floor • Agricultural properties, open space, and other low intensity uses • Special properties

Adapted from Table 12.1.1, NFPA Fire Protection Handbook, 20th edition, 2008, page 12-12 and from "Fires by occupancy or Property Type," National Fire Protection Association, 2019.

It is also important to examine historic incident data to analyze the number of all incidents within the District by property use. This holistic approach is designed to assist with local risk planning as shown in Figure 75 and Figure 76.

Figure 75: Count of All Incidents by Property Use by Department, 2017–2018 (NFIRS)

NFIRS Property Use Category	ARFD	BUFD	CHFD	DXFD	FGFD	JAFD	NDFD	RSFD	TRFD	WHFD	WIFD	ESD 2
1 – Assembly	.4	11	7	8	26	0	21	2	7	13	15	118
2 – Educational	20	41	10	10	3	1	0	1	5	0	11	102
3 – Health Care, Detention & Correction	1	0	6	14	14	0	7	0	0	2	21	65
4 – Residential	103	315	297	247	283	133	261	127	142	252	82	2,242
5 – Mercantile, Business	3	10	16	10	18	5	11	14	6	7	14	114
6 – Industrial, Utility, Agriculture, Mining	24	10	26	27	12	18	14	5	4	12	27	179
7 – Manufacture	3	0	1	2	1	0	2	0	0	3	3	15
8 – Storage	6	18	23	12	10	1	21	12	5	14	13	135
9 – Outside Property, Highway, Residential Street	136	245	407	350	375	219	358	338	174	301	361	3,264
Total Incidents	**304**	**650**	**793**	**680**	**742**	**377**	**695**	**499**	**343**	**604**	**547**	**6,234**

Figure 76: Percentages of All Incidents by Property Use by Department, 2017–2018 (NFIRS)

NFIRS Property Use Category	ARFD	BUFD	CHFD	DXFD	FGFD	JAFD	NDFD	RSFD	TRFD	WHFD	WIFD	ESD 2
1 – Assembly	3%	2%	1%	1%	4%	0%	3%	0%	2%	2%	3%	2%
2 – Educational	7%	6%	1%	1%	0%	0%	0%	0%	1%	0%	2%	2%
3 – Health Care, Detention & Correction	0%	0%	1%	2%	2%	0%	1%	0%	0%	0%	4%	1%
4 – Residential	34%	48%	37%	36%	38%	35%	38%	25%	41%	42%	15%	36%
5 – Mercantile, Business	1%	2%	2%	1%	2%	1%	2%	3%	2%	1%	3%	2%
6 – Industrial, Utility, Agriculture, Mining	8%	2%	3%	4%	2%	5%	2%	1%	1%	2%	5%	3%
7 – Manufacture	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
8 – Storage	2%	3%	3%	2%	1%	0%	3%	2%	1%	2%	2%	2%
9 – Outside Property, Highway, Residential Street	45%	38%	51%	51%	51%	58%	52%	68%	51%	50%	66%	52%
Total incidents	**5%**	**10%**	**13%**	**11%**	**12%**	**6%**	**11%**	**8%**	**6%**	**10%**	**9%**	**100%**

The preceding figures provide important insight into overall service demand across the District. Given the predominantly rural nature of the District with several small, urban communities (towns and cities), the historic patterns of service demand should be considered for future planning purposes. Key findings from this analysis are:

- A majority (52 percent) of all emergency service demand is associated with outside properties, highways, and streets. This is directly linked to the large number of MVCs (24 percent of all incidents) and outside fires (57 percent of all fires and 12 percent of all incidents)
- Over one-third (36 percent) of all emergency responses are associated with residential properties, typically one- or two-family dwellings. This is directly linked to the number of residences when compared to all other property uses and the traditional pattern of the number of emergencies that occur in the home.
- Overall, emergency responses are fairly evenly spread across the entire District, with more calls in more populous areas, as expected.
- Both Arp VFD and Bullard VFD experienced a higher than expected number of responses in educational occupancies. Additional study is suggested to determine possible causes and if additional school safety measures or public education are needed.
- Winona VFD experienced a higher than expected number of responses in health care, detention and correction occupancies. Additional study is suggested to determine possible causes and if additional safety measures or public education are needed.
- Winona VFD experienced a lower than expected number of responses in residential occupancies. Additional study is suggested to determine if this is an anomaly of the data, low population, or other or possible causes.

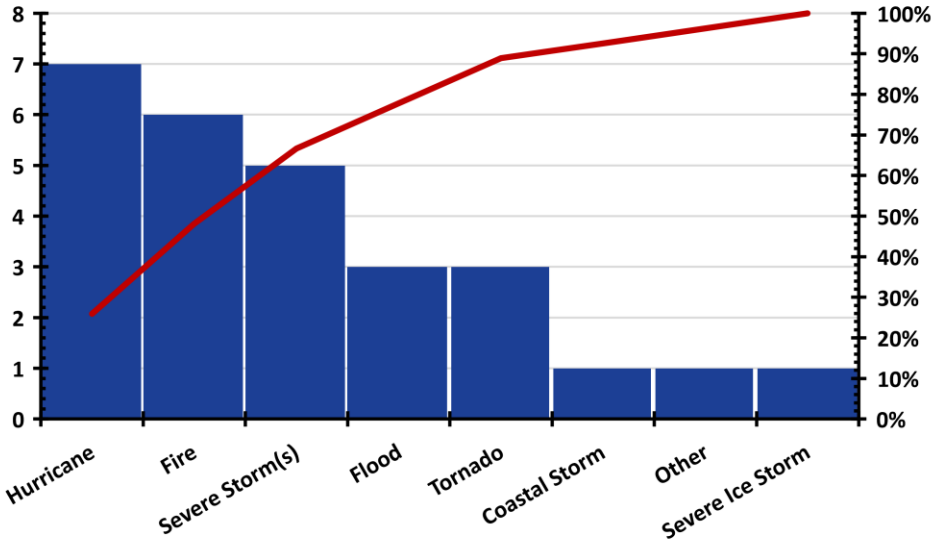
Geographic and Weather-Related Risks

By evaluating the number and frequency of Federal disaster declarations affecting Smith County, the risks that natural hazards pose to the study area can be evaluated. The following are statistical highlights of major natural disasters in Smith County as provided by FEMA.[10]

- 27 Federal disaster declarations have been declared for the study area since 1965.
- 26% of declarations involved tropical storms or hurricanes (including Tropical Storms Allison and Charlie, and Hurricanes Ike, Gustav, Dean, Rita, and Katrina).
- 11% of declarations involved tornadoes.
- 11% of declarations involved flooding.
- 22% of declarations involved wildfires or extreme fire hazards.
- 4% of declarations involved ice storms (only a single declaration in 2001).

While the preceding percentages can be useful for planning purposes, it should be noted that not every natural hazard event in which significant impacts are felt across the community will trigger Federal disaster declarations. In general, extreme storms including things such as lightning strikes and tornadoes, or even tropical storm and hurricane conditions, appear to present the highest risk of natural hazards to the area.

Figure 77: FEMA Declared Disasters Since 1965 in Smith County



Weather Risks

The climate for Smith County is similar to what is found across many areas in the State of Texas. Smith County receives an average annual precipitation of over 46 inches which is relatively spread evenly throughout the year. Snowfall in the county is infrequent but it is important to note the single Federal disaster declaration resulting from ice storms. In general, Smith County's summers are hot with an average temperature of 82.5 degrees Fahrenheit and the winters are cool with average temperatures of 49.5 degrees Fahrenheit.

Flood Risk

Flooding can produce various associated risks to a community. Because of this, areas of communities that fall within flood zones and also areas prone to flooding events should be informed of the risks. Before a flood occurs and during the planning process, the location of emergency services stations should be evaluated as to how they relate to flood zones. To ensure readiness, public education campaigns should also occur prior to events and during the planning process providing information to residents as to the risks associated with flooding and prevent actions they can take.

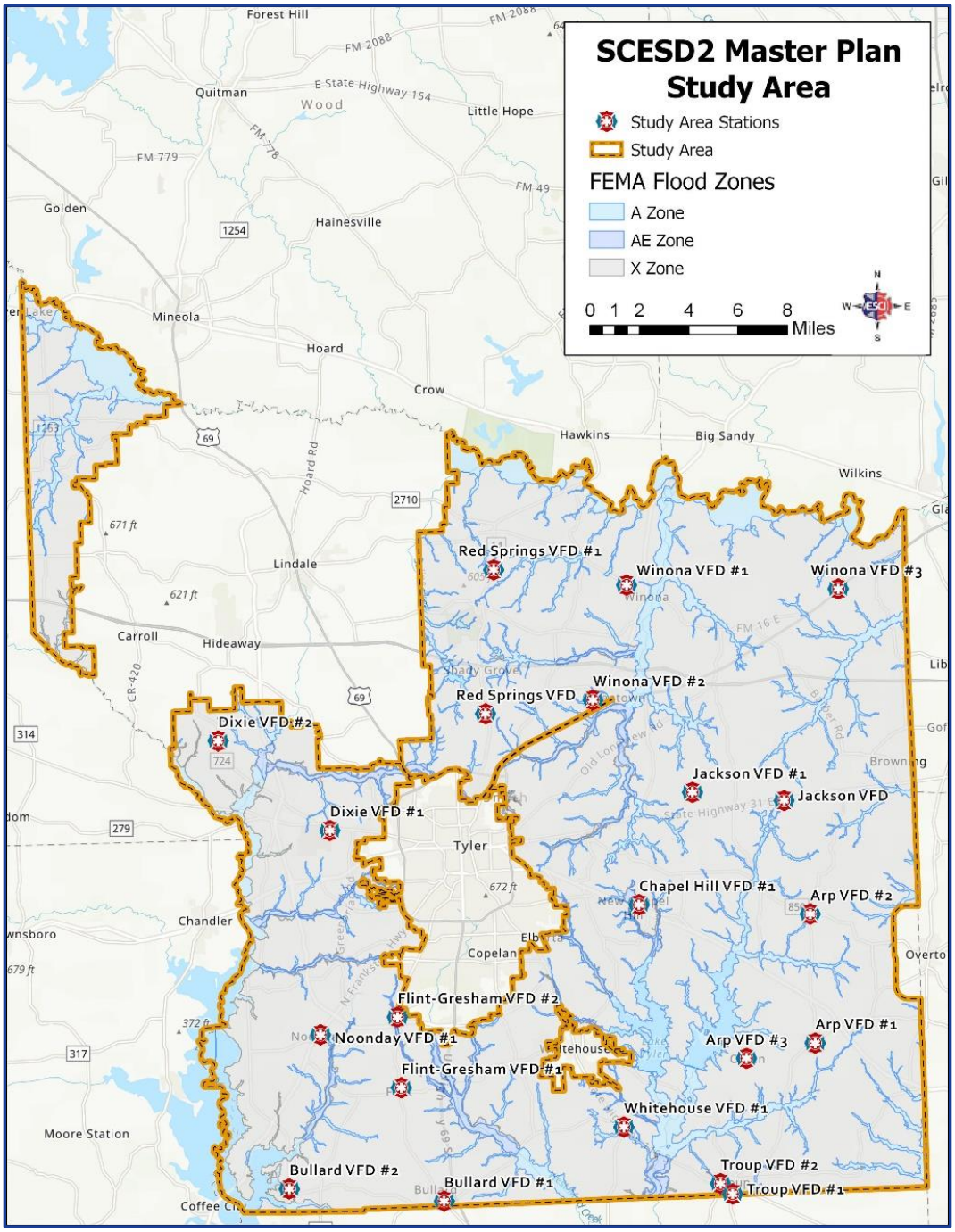
It should be expected that emergency services will be called upon to assist with evacuations and rescues during flooding events. Evacuation could include large areas and facilities with high populations requiring significant EMS resources. When these evacuations and rescues involve moving water, specialty trained technical rescue teams may be needed.

Post-flood event, EMS related incidents should be expected to increase as injuries and medical conditions typically occur. Public education can also properly prepare a community for this post-event and recovery process.

In general, flooding is typically the result of excessive precipitation. In Smith County, this is typically a result of slow-moving thunderstorms or heavy rains associated with tropical events such as tropical storms and hurricanes. With Smith County's geographic location being inland, most flooding occurs from overbank flooding of rivers and streams. Riverine flooding occurs when excessive flow and volume of water crests a river channel's normal capacity. Flood waters will then inundate areas within the river's floodway, flood plain, and other low-lying areas. The main sources of this flooding within Smith County include Black Fork Creek, Butler Creek, Gilley Creek, Harris Creek, Henshaw Creek, Indian Creek, Ray Creek, Shackelford Creek, West Mud Creek, Wiggins Creek, and Willow Creek.

In addition to the overbank flooding of rivers and streams, flooding can be a result of urbanization. This urban flooding occurs when excessive precipitation is not readily absorbed by the ground and the stormwater runoff exceeds the ability of stormwater infrastructure. This results in the possibility of localized flooding of streets, parking lots, homes, and businesses. The next figure illustrates the Flood Zones in Smith County.

Figure 78: Smith County Flood Zones



As noted in the Smith County 2018 Hazard Mitigation Plan, 21 flash flood or heavy rain events were recorded in Smith County between 2008 and 2017, resulting in two injuries and $338,000 in estimated property damage.

Tornadoes

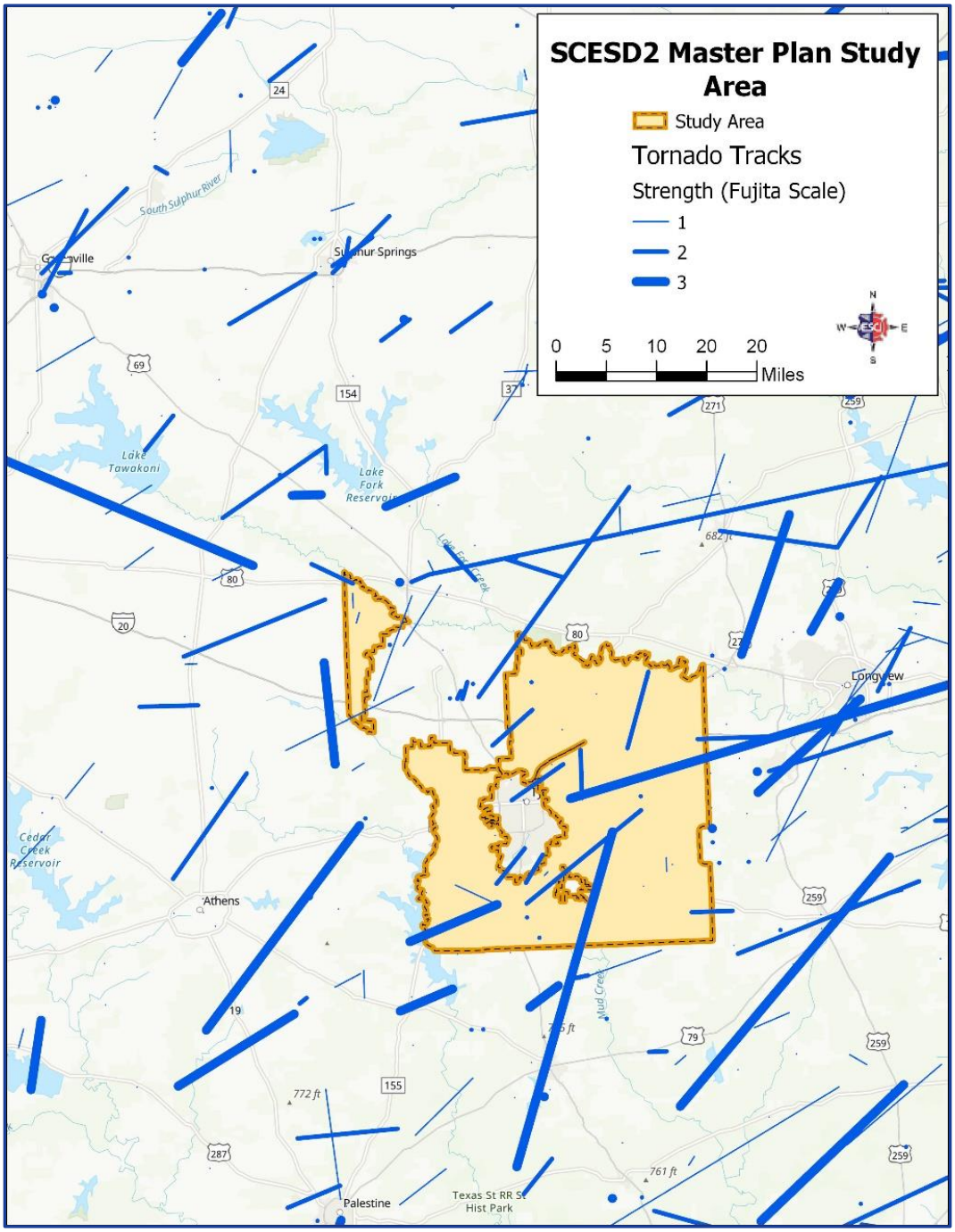
According to the National Weather Service Storm Prediction Center, the State of Texas has the highest risk of tornadoes in the country. At the higher end of the range, tornadoes can pose a significant danger to life and property. The intensity of tornadoes is measured on the Enhanced Fujita Scale which was a revision of the original Fujita Scale developed in 1971. This scale has an intensity range for tornadoes from EF-0 to EF-5 based on wind estimates. The next figure provides a summary of the damage that is typically associated at the various levels.

Figure 79: Tornado Intensity—Enhanced Fujita Scale

Designation	Wind Speed, mph	Typical Damage
EF-0	65–85	Minor or no damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over. Confirmed tornadoes with no reported damage (i.e., those that remain in open fields) are always rated EF-0.
EF-1	86–110	Moderate damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF-2	111–135	Considerable damage. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF-3	136–165	Severe damage. Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations are badly damaged.
EF-4	166–200	Devastating damage. Well-constructed and whole frame houses completely leveled; cars and other large objects thrown, and small missiles generated.
EF-5	> 200	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (109 yds.); high-rise buildings have significant structural deformation; incredible phenomena will occur.

On average, 132 tornadoes touch the ground within the State of Texas annually resulting in more recorded tornadoes than in any other state. As noted in the Smith County 2018 Hazard Mitigation Plan, 14 tornadoes touched down in Smith County between 2008 and 2017, resulting in two injuries and $1,470,000 in estimated property damage. The following figure illustrates the paths of tornadoes that have occurred within Smith County between EF1 and EF3 tornadoes from February 1950, to April 2016.

Figure 80: Tornado Tracks Through Smith County, 1950–2016



Lightning

Lightning can be a common occurrence within Smith County with the National Lightning Detection Network predicting an average of 32 lightning strikes per day which can cause significant issues. According to the Smith County 2018 Hazard Mitigation Plan, nine lightning events were recorded between 2008 and 2017, resulting in $295,200 in estimated property damage.

High Wind

High winds are also commonly associated with thunderstorms and can cause significant property damage in highly populated areas. High winds can be sustained and straight-line, blowing in a single direction, or rotating as in a tornado. The National Weather Service defines high winds as sustained wind speeds of 40 mph or greater lasting for one hour or longer, or winds of 58 mph or greater for any duration.

As with many parts of the country, Smith County is directly or indirectly susceptible to the effects of high-speed winds. While typically not causing injuries and deaths, high winds can cause significant damage to properties and crops. According to the Smith County 2018 Hazard Mitigation Plan, one hundred and thirteen events were recorded between 2008 and 2017, resulting in $922,040 in estimated property damage.

Hail

It should be assumed that some damaged caused during identified severe storm events were the result of hail incidents. Specifically, 89 total hail events were recorded between 2008 and 2017, resulting in $55,500 in estimated property damage according to the Smith County 2018 Hazard Mitigation Plan.

Winter Storm

Winter storms can occur in the form of snowstorms, blizzards, cold waves, and ice storms. While this is a rare event in and around Smith County, they are possible throughout the study area. While 16 winter storm events were recorded between 2008 and 2017, according to the Smith County 2018 Hazard Mitigation Plan, there were no reports of property damage, injuries, or deaths.

Wildfire[11]

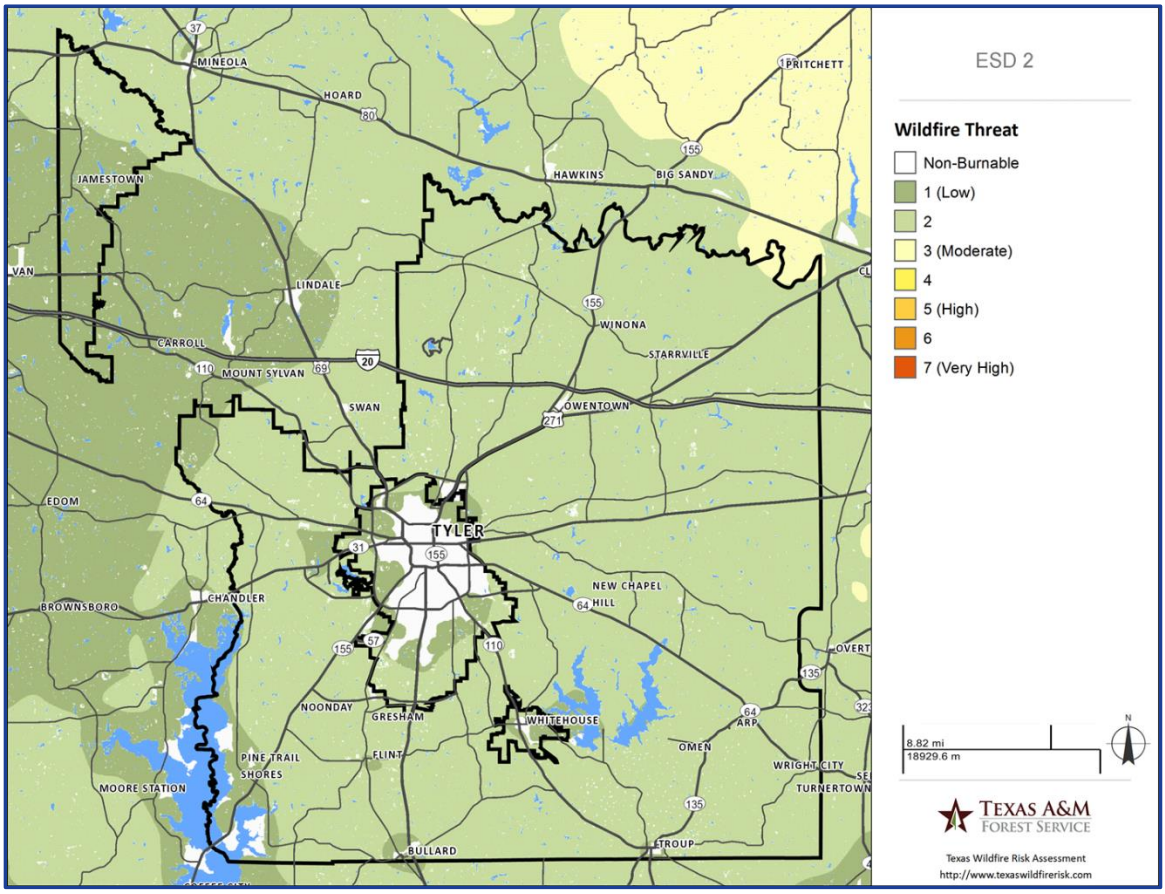
Wildfire threat is the likelihood of a wildfire occurring or burning into an area. The threat is derived by combining a number of landscape characteristics including surface fuels and canopy fuels, resultant fire behavior, historical fire occurrence, percentile weather derived from historical weather observations, and terrain conditions. These inputs are combined using analysis techniques based on established fire science.

The measure of wildfire threat used in the Texas Wildfire Risk Assessment (TWRA) is called Wildland Fire Susceptibility Index, or WFSI. WFSI combines the probability of an acre igniting (Wildfire Ignition Density) and the expected final fire size based on the rate of spread in four weather percentile categories. WFSI is defined as the likelihood of an acre burning. Since all areas in Texas have WFSI calculated consistently, it allows for comparison and ordination of areas across the entire state. For example, a high threat area in East Texas is equivalent to a high threat area in West Texas.

To aid in the use of Wildfire Threat for planning activities, the output values are categorized into seven classes. These are given general descriptions from Low to Very High threat.

The threat map illustrated in the next figure is derived at a 30-meter resolution. This scale of data was chosen to be consistent with the accuracy of the primary surface fuels dataset used in the assessment. While not appropriate for site-specific analysis, it is appropriate for regional, county, or local protection mitigation or prevention planning.

Figure 81: Wildfire Threat in SC-ESD 2



Wildland Urban Interface (WUI)

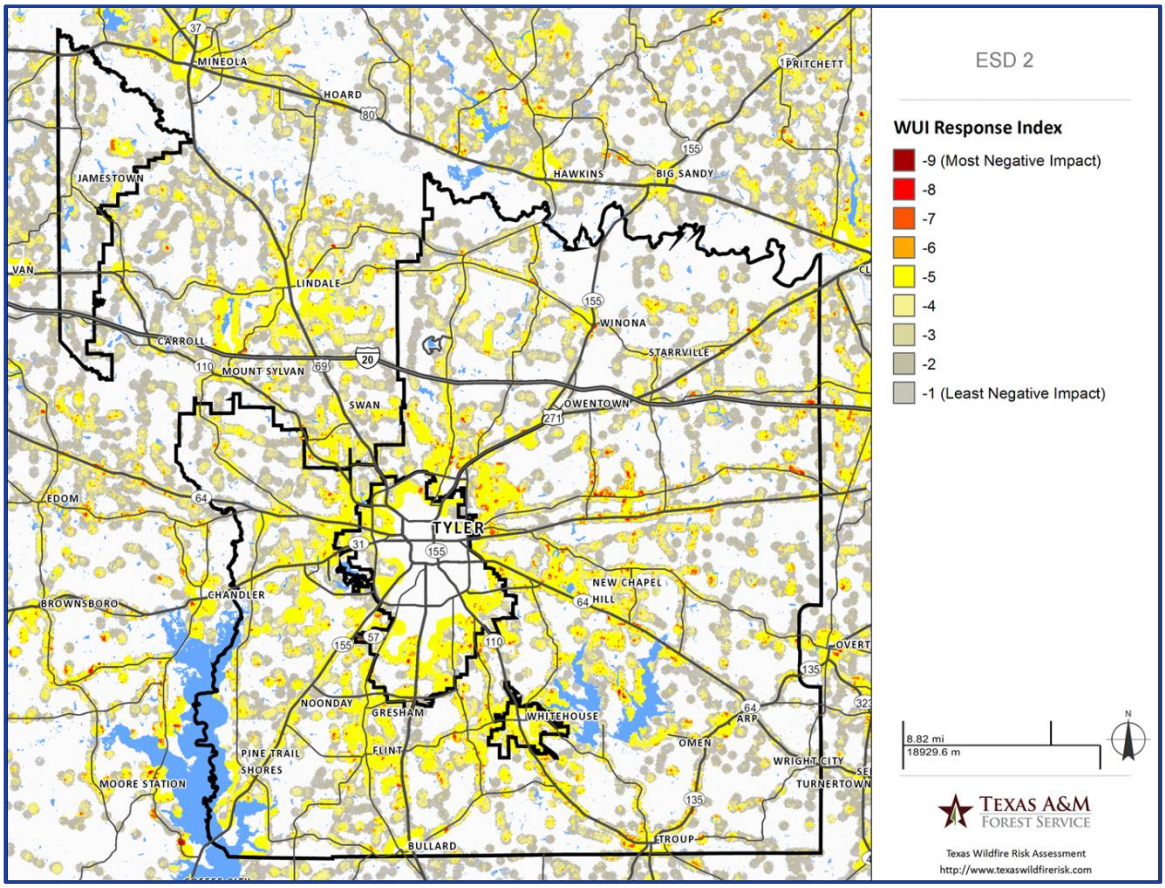
The Wildland Urban Interface (WUI) Response Index layer is a rating of the potential impact of wildfire on people and their homes. The key input, WUI, reflects housing density (houses per acre) consistent with Federal Register National standards. The location of people living in the Wildland Urban Interface and rural areas is key information for defining potential wildfire impacts to people and homes.

The WUI Response Index is derived using a Response Function modeling approach. Response functions are a method of assigning a net change in the value to a resource or asset based on susceptibility to fire at different intensity levels, such as flame length. The range of values is from -1 to -9, with -1 representing the least negative impact and -9 representing the most negative impact. For example, areas with high housing density and high flame lengths are rated -9 while areas with low housing density and low flame lengths are rated -1.

To calculate the WUI Response Index, the WUI housing density data was combined with Flame Length data and response functions were defined to represent potential impacts. The response functions were defined by a team of experts led by the Texas A&M Forest Service mitigation planning staff. By combining flame length with the WUI housing density data, you can determine where the greatest potential impact on homes and people is likely to occur.

Fire intensity data is modeled to incorporate penetration into urban fringe areas so that outputs better reflect real-world conditions for fire spread and impact in urban interface areas. All areas in Texas have the WUI Response Index calculated consistently, which allows for comparison and ordination of areas across the entire state. Data is modeled at a 30-meter cell resolution, which is consistent with other TWRA layers.

Figure 82: WUI in SC-ESD 2

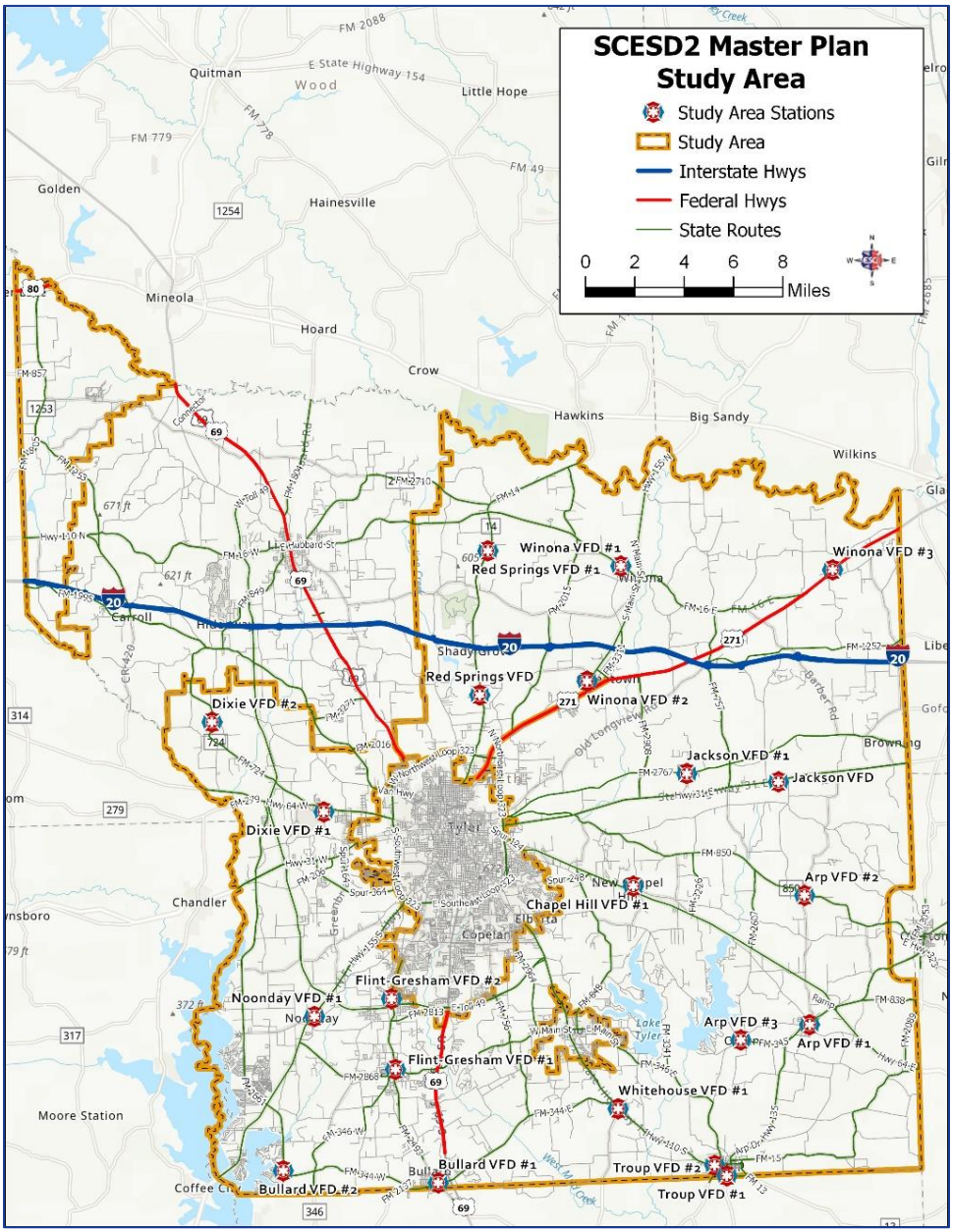


Transportation Risks

Transportation corridors provide necessary access and egress for emergency service providers to reach the scene of incidents throughout the study area. However, the specific configuration of transportation systems can also affect the response capabilities of emergency service providers. Limited access highways and railroad lines can interrupt street connectivity forcing apparatus to negotiate a circuitous route in order to reach the scene of an incident.

Highways

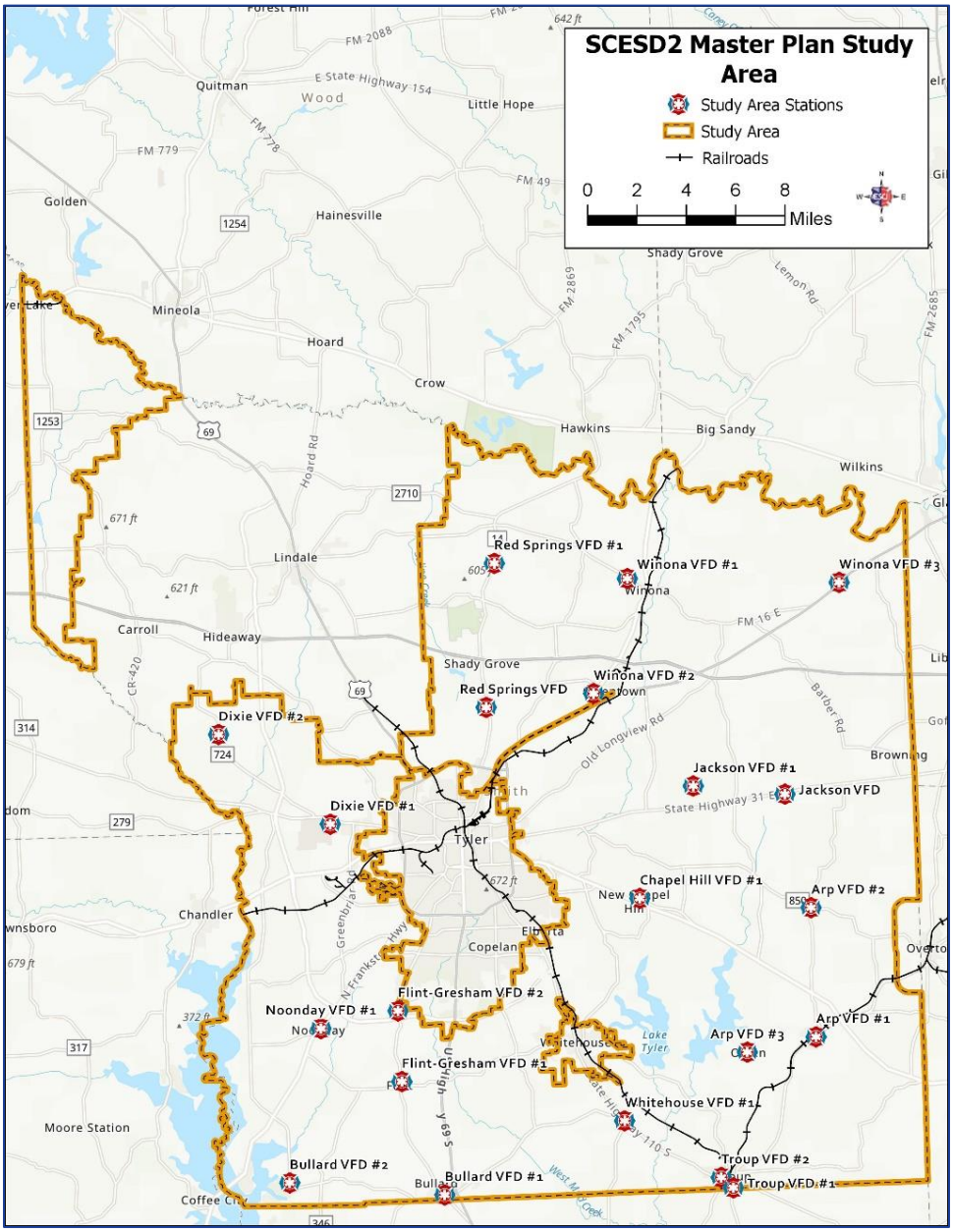
Figure 83: Major Highways Through Smith County



Railroads

The following figure shows that railway lines go through the SC-ESD 2 in several areas.

Figure 84: Railroad Right-of-Ways Through in SC-ESD 2



Although a comparatively safe mode of transport, railway operations do come with hazards. Some of the hazards associated with Railway operations are described in the next figure.

Figure 85: Potential Rail Incident Types and Effects

Type of Incident	Description/Hazard
Train Collisions	Collisions can be between two or more trains or between trains and infrastructure.
Derailments	Derailments occur when one or more cars of a train leave the tracks; generally, involves just one train.
Grade Crossings Crashes	There are various scenarios in which accidents occur at railroad crossings.
Railroad Staff Injuries	Railroad staff may get injured while working on or near the tracks. In some cases, accessibility will be a problem.
Dangerous Goods Release	As the railroads carry dangerous goods there is always the potential for product release.

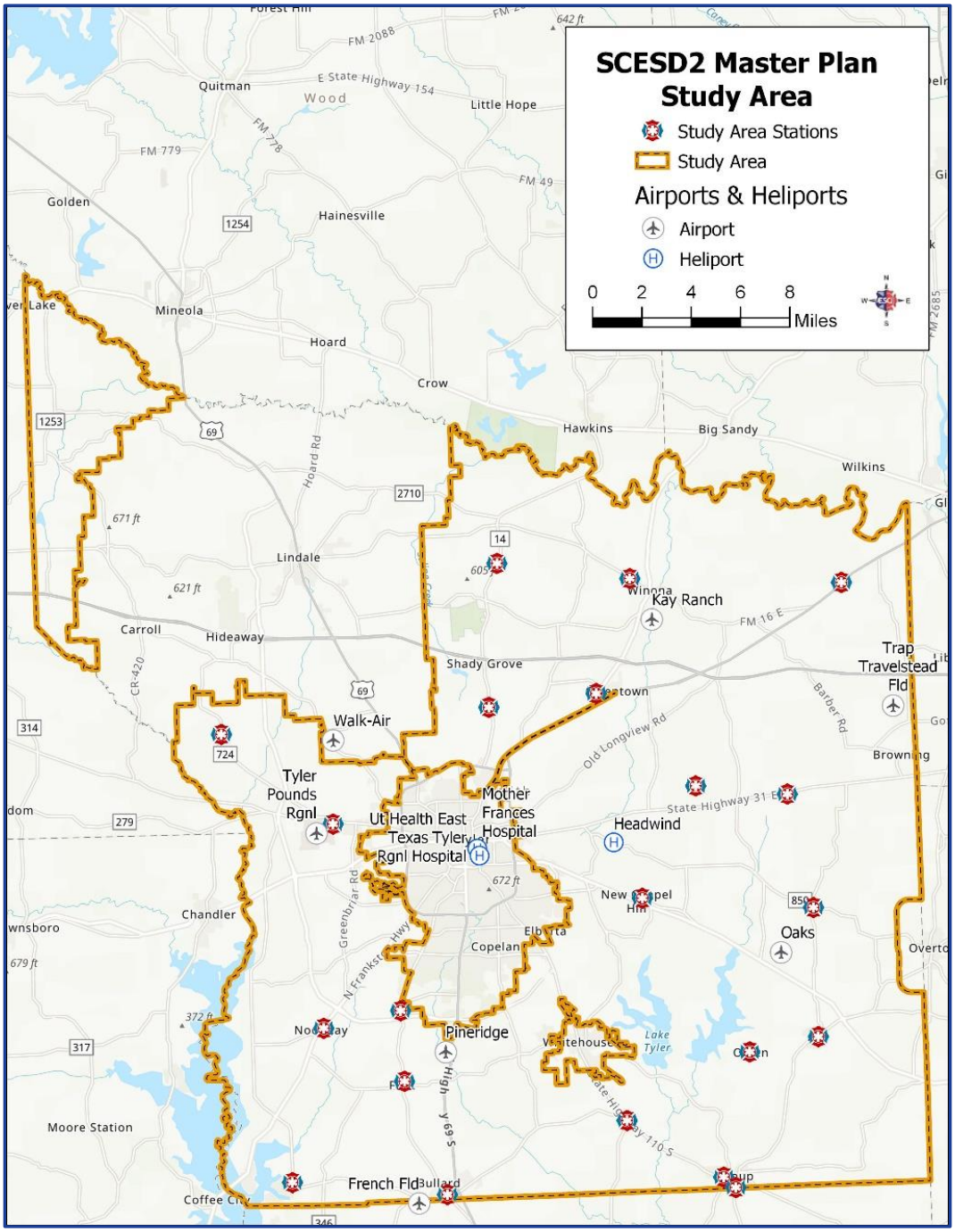
The effects of these incidents can require large numbers of SC-ESD 2 resources. In review of the previous figure, it is clear that several of these incidents could require the response of Haz Mat, Technical Rescue, and EMS. Many times, the complexity of the incidents will require multiple operational periods. Risk analysis and planning for these types of incidents must consider the need for higher than usual personnel and equipment resources. When incidents occur at grade crossings, SC-ESD 2 personnel will have to operate near the tracks. Training in proper precautions is essential.

Airports

The primary airport in Smith County is Tyler Pounds Regional Airport (TYR). This airport provides both commercial carrier (American Eagle and Frontier) and general aviation services. While this airport is inside the City of Tyler, it is adjacent to the community of Dixie and all flight paths are in the response area of the District. There are also several public and private airports and heliports located throughout the District. Regardless of the type of airport, each poses a significant risk associated with aircraft landings and departures. In addition, aircraft and fuel storage at the airport itself can also pose a risk.

The next figure illustrates the geographic location of the airports and helipads in Smith County.

Figure 86: Airports and Helipads in SC-ESD 2



Buildings

Colleges and Schools

Colleges and school facilities present increased risks for any community and are susceptible to incidents of fire, criminal mischief, or potentially terrorism. These additional risks are in large part due to the potential large loss of life and the social impact of a loss due to fire, structural collapse, or a human-caused event such as an active shooter.

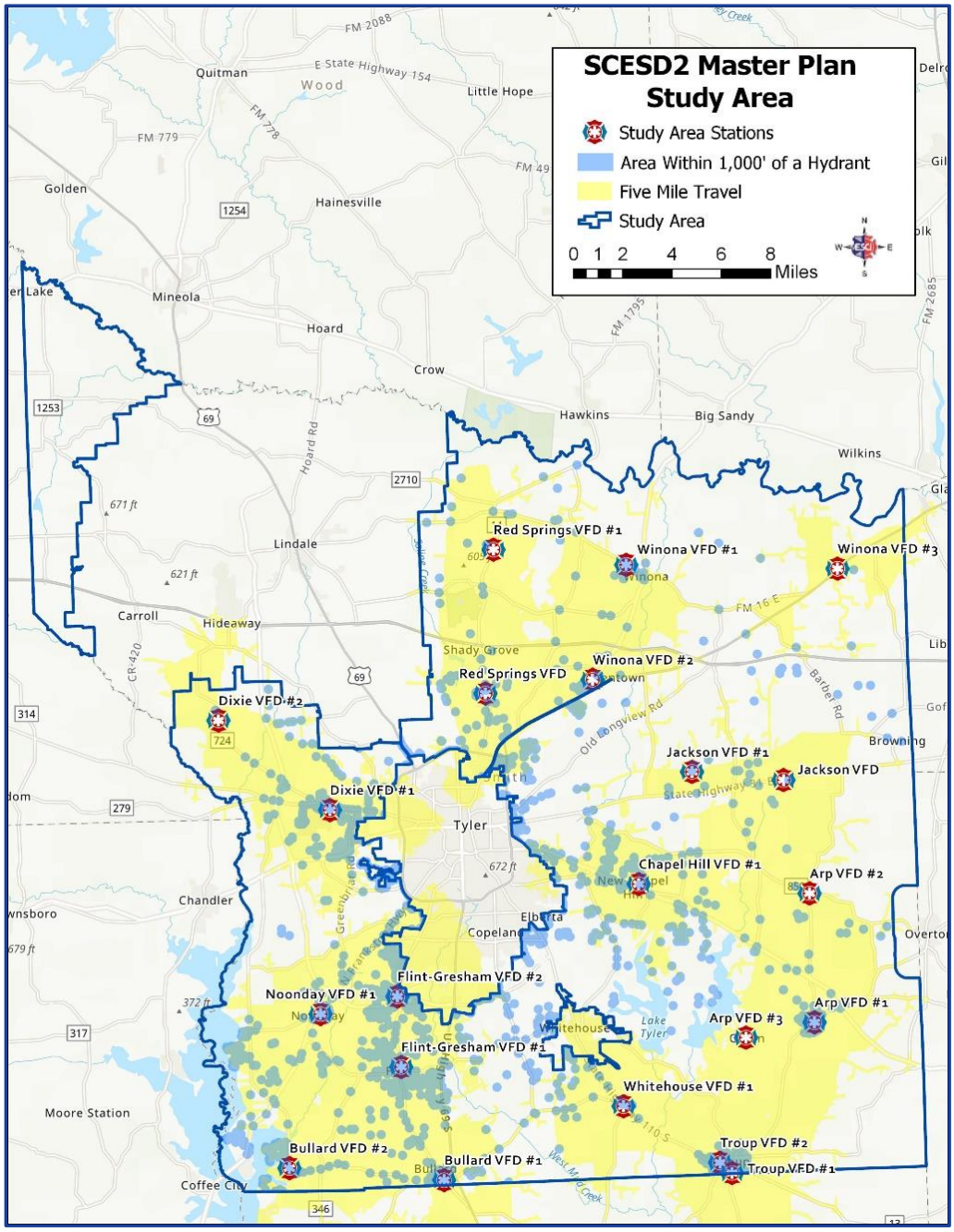
Medical and Congregate Care Facilities

Medical and congregate care occupancies include facilities such as hospitals, clinics, skilled nursing facilities, and assisted living facilities. Due to the many occupants within these facilities being physically unable to leave without assistance, an elevated life safety risk exists. In addition, these facilities typically represent an increasing demand for emergency medical services based on their common occupants. Any type of incident at these facilities would require increases resource levels.

Other Critical Infrastructure

One major concern to fire departments is the water and fire hydrant system. Providing enough storage, distribution, and access to this valuable firefighting resource is very important. The next figure illustrates the hydrant system for SC-ESD 2. As expected in the more populated urbanized areas, fire hydrant coverage is very good. The rural areas of the District depend on water delivered by tenders. From a risk assessment standpoint, planning consideration must be given to situations when the water system could fail. Failure will require adjustments to response procedures.

Figure 87: SC-ESD 2 Hydrant System



The Smith County Sheriff's Department Communication Division answers all non-emergency and 911 calls placed in the unincorporated areas of Smith County and also in the cities of Whitehouse, Troup, Bullard, Arp, and Winona. Dispatchers are responsible for answering all calls for service placed to the Communications Division of Law Enforcement, Fire Service, and Smith County Animal Control. Smith County Sheriff's Office dispatchers field an average of over 70,000 calls for service each year. The equipment used in the Communications Division includes an 800 MHz Motorola Radio System, Spillman Computer Aided Dispatch software, and Vesta Phone system. Continuity of operations from this center at times of disaster is essential.

There are other communication facilities and equipment that are equally important to the community and government operations within Smith County. These are the telephone company central offices and the transmission lines of local telephone service providers. Internet service providers, along with wireless cellular communication providers, provide essential communication capabilities for the community as well as emergency personnel through their facilities and equipment. Failures in any of these systems can influence emergency services.

Terrorism

As with any location, Smith County is a potential target for terrorism. Most of the previously identified risks in the preceding section are potential targets for such activities. In addition, any public gathering events throughout the year can also be targets. Emergency service providers should remain vigilant in their training programs and preparedness in the event one or more coordinated acts of terror occur within the study area.

Demographics

Current Population Information

The cities of Arp, Bullard, Hideaway, Lindale, New Chapel Hill, Noonday, Troup, Tyler, Whitehouse, and Winona lie within the borders of Smith County. The next figure is a summary of the 2017 population estimates for each city based on 2017 U.S. Census Bureau information and compiled by the County Information Program, Texas Association of Counties. It should be noted that when parts of a city lie outside of the county border, only the areas within Smith County are included in the population estimates.

Figure 88: SC-ESD 2 Population Estimates by City Served

City (Smith County)	2017 Population Estimate
Arp	1,004
Bullard	3,227
Hideaway	3,127
New Chapel Hill	627
Noonday	719
Troup	1,936
Winona	601
Balance of County (Unincorporated)	81,485
Total	**92,726**

The National Fire Protection Association (NFPA), through research and assessments of fire risks, has identified vulnerable groups or individuals that face a higher risk of injury or death in a home fire.[12] The findings of this NFPA research are:[13]

- Males were more likely to be killed or injured in home fires than females and accounted for larger percentages of the victims (57% of the deaths and 54% of the injuries).
- Those at highest risk do not necessarily account for the largest number of casualties. Although people 85 and over had the highest rate of fire death and injuries per million population, they only account for 2% of the population. Consequently, the actual number of victims that age is smaller than victims in lower-risk age groups.
- The largest number of deaths (19%) in a single age group was among people 55 to 64. Twelve percent of the population was in that age group.
- Half (50%) of the victims of fatal home fires were between 25 and 64, as were three of every five (62%) of the non-fatally injured.
- One-third (33%) of the fatalities were 65 or older; only 15% of the non-fatally injured were in that age group.
- Children under 15 accounted for 12% of the home fire fatalities and 10% of the injuries. Children under five account for 6% of the deaths and 4% of the injuries.
- Adults of all ages had higher rates of non-fatal fire injuries than children. Less variation is seen in non-fatal injury rates between age groups than with death rates.
- The risk associated with different fire causes varies by age group.
  - While smoking materials were the leading cause of home fire deaths overall, this was true only for people in the 45 to 84 age groups.
  - For adults 85 and older, cooking was the leading cause of fire death.

The next figure identifies these at risks populations and provides a percentage estimate of those living within the study area. These figures are based on the U.S. Census Bureau's 2018 population estimates for Smith County.

Figure 89: Smith County At-Risk Populations[1]

Description	Measure
Males	48.3%
Children under 5 years of age	6.9%
Children under 15 years of age	20.7%
between 25 and 64 years of age	49.5%
Between 55–64 years of age	12.1%
Between 45–84 years of age	38.0%
85 years and over	1.8%

[1] https://factfinder.census.gov/bkmk/table/1.0/en/ACS/17_5YR/DP05/0500000US48423

Population Density

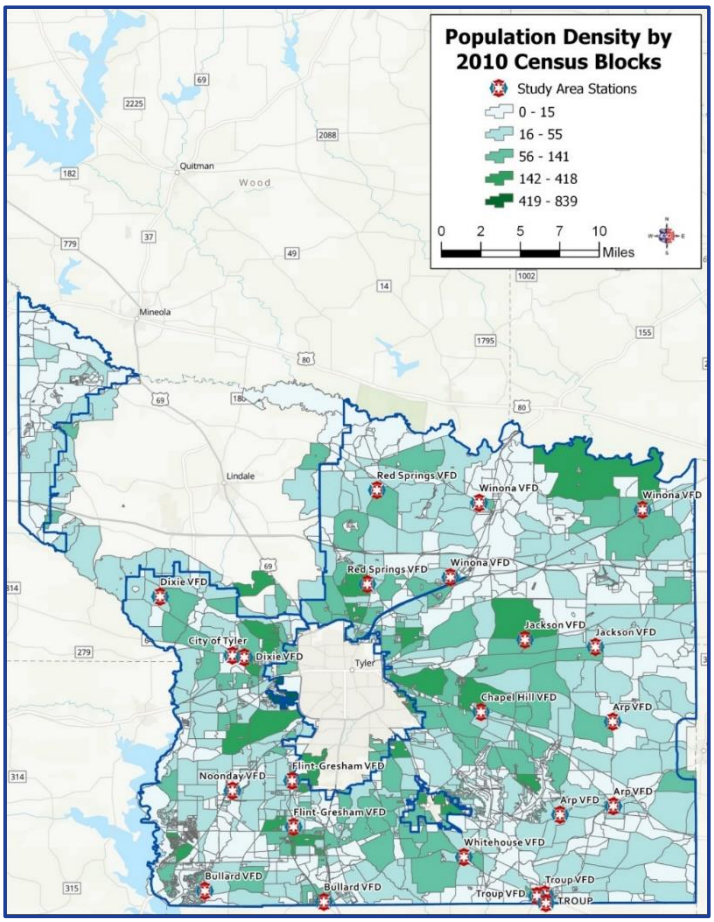
Most counties throughout the country contain areas with different population densities resulting in varying levels of property risks. This is important to analyze as policymakers can utilize this information to specify different performance objectives based on the specific geographic area. NFPA utilizes this information when specifying response requirements and has identified classifications based on specific criteria. The next figure summarizes the NFPA classifications and criteria for each.

Figure 90: Population Classification

Classification	Criterion
Urban	> 1,000 people/square mile
Suburban	500–1,000 people/square mile
Rural	< 500 people/square mile
Remote Area	Travel Distance ≥ 8 miles

As is common in many communities, population density varies throughout Smith County as shown here (also refer to Figure 56). Darker colors represent greater population densities and these areas can be refined to specific locations throughout the jurisdiction.

Higher population densities can be found geographically around the City of Tyler along with several other pockets throughout the study area. This creates variations in service demand, with higher demand in more-populous areas. It is expected that this trend in service delivery patterns will continue.



SECTION II: FUTURE SYSTEM DEMAND PROJECTIONS

POPULATION GROWTH PROJECTIONS

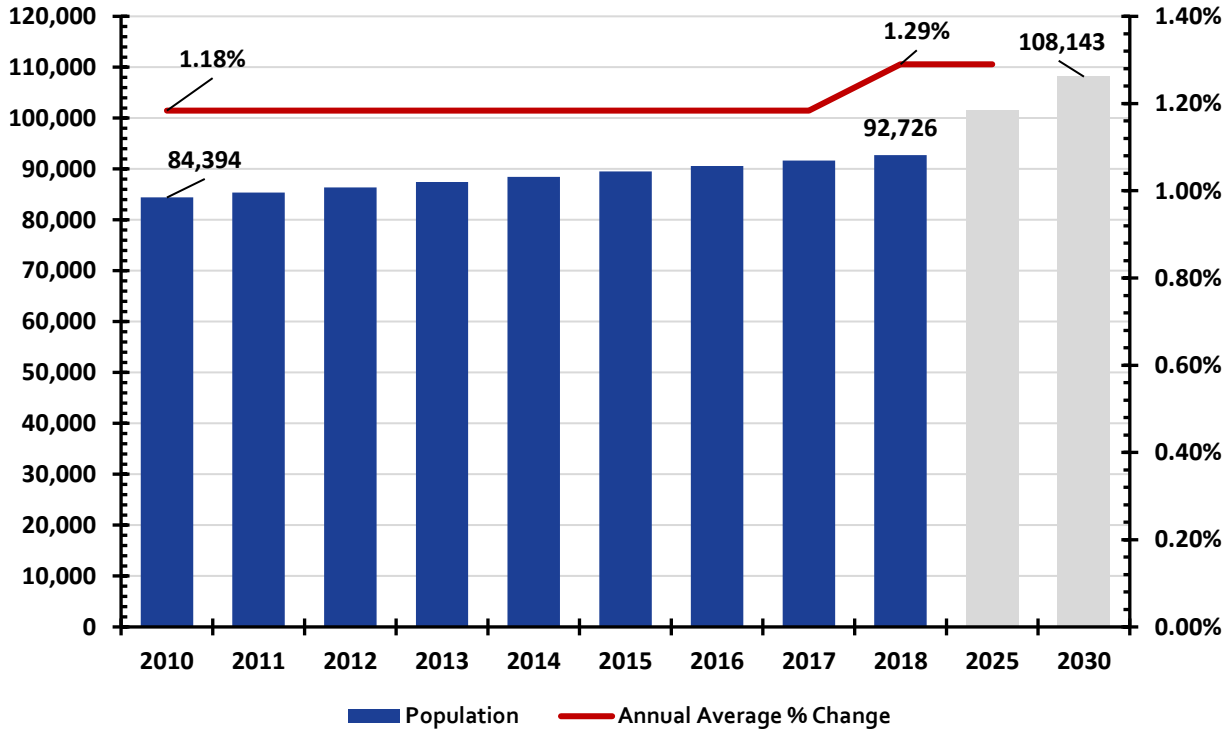
Population History

As of July 2018, the U.S. Census Bureau estimates that the entire population for Smith County was 230,221. From 1970 to 2018, Smith County has grown 137 percent.

For evaluation purposes, the Smith County population was adjusted to exclude the cities of Tyler, Whitehouse, and Lindale as well as the unincorporated areas in the coverage areas of SC-ESD 1. According to U.S. Census Bureau data, the population for this area was 92,726 in 2018. From 2010 to 2018, the annual growth rate was 1.17 percent per year.

The next figure is a summary of the population changes from 2010 to 2018, as estimated using ESRI population and historical growth from 2010 to 2018. The projected growth through 2030 as estimated by ESRI is 1.29 percent.

Figure 91: SC-ESD 2 Population History and Projections



Because the overall population growth from 2018 to 2023, is estimated to grow 1.29 percent annually, the forecast in the previous figure is based on a fixed percentage.

Census-Based Population Growth Projections

Texas is one of the fastest growing states. For years, demographers have cited a population triangle in the Dallas-Fort Worth to Austin and San Antonio area and now the trend is moving to East Texas.[14] Businesses and retirees locate into Smith County because of the quality of life and economic opportunity found in the area. An increase in an aging population translates into higher demands for healthcare facilities and emergency medical services and poses a higher risk of fire death. From 2007 to 2016, the fire death rate trend for older adults (ages 65 and older) decreased 19 percent, however, older adults still face 2.5 times greater relative risk of dying in a fire versus the general population.[15]

As the next figure shows, there is an anticipated growth of 116 percent from 2010 to 2050 for the 65 and over population in Texas.

Figure 92: Texas Population Projections by Age Group, 2010 to 2050[1]

Age Group	2010	2020	2030	2040	2050	2010–2050 Percent Change
65 and Older	2,601,886	4,014,083	5,929,471	7,583,385	9,442,865	263%
65–69	853,100	1,375,699	1,779,930	2,019,401	2,519,575	195%
70–74	619,156	1,081,697	1,569,556	1,747,404	2,136,439	245%
75–79	477,245	714,641	1,181,376	1,568,513	1,830,330	284%
80–84	347,206	440,399	794,965	1,186,724	1,365,653	293%
85+	205,501	401,647	603,644	1,061,343	1,590,868	421%
Total Population	**25,145,561**	**30,541,978**	**37,155,084**	**44,955,896**	**54,369,297**	**116%**

[1] retrieved from https://demographics.texas.gov/Resources/publications/2016/2016_06_07_Aging.pdf

Community Planning-Based Population Growth Projections

When evaluating community planning based on population growth predictions, it is imperative to consider changes in community needs that could directly affect public service demand. Any changes in service demand require changes and adjustments in the deployment of staff and resources to maintain acceptable levels of performance.

The Smith County area is predicted to produce a forecast for a steady increase in growth. Demographic growth for Smith County is being caused by domestic migration and will include young families, bringing down the average age. The estimated population for the Smith County area is 108,143 in 2030. Growth will bring home sales up and increase property values. Job growth is demanding the need for a higher paying, more educated workforce, which reduces the low-income socioeconomic risk considered in community risk reduction for the fire service. These population changes within the community are significant in relation to future service demands on critical infrastructure and public safety.

A major natural or man-made disaster can significantly change the population growth as well. Growth projections diminish based on the initial rescue and recovery stages of the disaster; however, these types of disasters have the potential to increase growth when significant recovery of structures and critical infrastructure are completed.

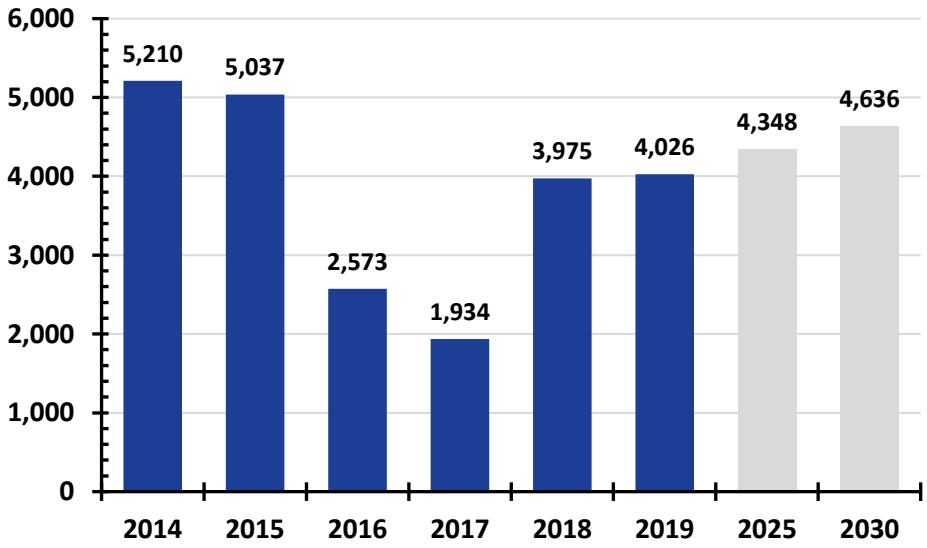
SERVICE DEMAND PROJECTIONS

In evaluating the deployment of facilities, resources, and staffing, it is imperative consideration be given to potential changes, such as population growth, that can directly affect emergency workload. Changes in service demand may require changes and adjustments in the deployment of staffing and capital assets in order to maintain acceptable levels of performance.

Generally, population growth projections, along with historical and forecast incident rates, are utilized to develop projections for future service demand. As population and demographics change, so will the service demand. To determine a historical demand, ESCI considered the last five years of data. It was not possible, however, to complete the analysis as the method of reporting incident changed in 2016. From 2014 to 2015, each responding department created its own incident report. This resulted in a multiple record count for a single incident. After 2016, this practice was discontinued and only one record was generated for each incident. This resulted in a decrease in a number of records in 2016. Additionally, in 2016 and 2017, changes were made into the types of EMS calls to which the departments responded. This created a decrease in incidents. With the process stabilized and the types of incidents to which a fire department responds clarified, the 2018 total of 3,975 will be used for the projections.

As the incident data history was unusable, the service delivery forecast was based on the projected population growth with the base year of 2018—3,975 incidents.

Figure 93: Service Delivery Forecast, 2019–2029



SC-ESD 2 should track call volume annually to determine whether changes in population and demographics over time have a positive or negative effect on service demand forecasts.

SECTION III:

FUTURE DELIVERY SYSTEM MODELS

ANALYSIS OF RESPONSE PERFORMANCE TARGETS

Response Time Performance

ESCI emphasizes the importance of establishing and regularly monitoring performance metrics for the deployment of resources. These metrics serve as the foundation for determining whether or not the organization is meeting the expectations of the community that it serves. Without regular and consistent performance evaluation, it is impossible to set and achieve goals established to meet community expectations.

Response standards established by SC-ESD 2 must originate from the community served to create a balance between what is desired and what can be afforded. Because of this, ESCI cannot establish baseline and benchmark performance metrics for a given organization. However, recommendations based on the analysis conducted throughout this report may be helpful in serving as a starting point for these discussions with the community as a reevaluation tool for the organization's current standards.

Response standards are individual to each organization. Multiple factors such as staffing, financial constraints, size of the service area, and political will influence each department's ability to set achievable goals and objectives for response. Based upon a review of call data, the overall response for all calls from the initial report to arrival on scene by the first unit was over 20 minutes, 90 percent of the time. Because benchmarks are intended to represent a goal that should be achievable, it is recommended that SC-ESD 2 consider a performance goal of 14 minutes at the 90th percentile until improvements to the system are made. Once improvements are made, target goals of 10 minutes in the suburban areas and 14 minutes in rural areas should be adopted.

Critical Tasks, Risk, and Staffing Performance

Work at fire emergencies can be categorized into two key components—life safety and fire flow. Life safety relates to the number of building occupants, their location within the structure, their status, and their ability to take self-preservation action. Life safety tasks involve the search, rescue, and evacuation of victims. The fire flow component creates an environment within the building that allows entry by firefighters and/or the escape of occupants, as well as the delivery of enough water to extinguish the fire.

Critical Tasking and Alarm Assignments

The service area includes a variety of metropolitan, urban, and suburban population densities, which presents varied staffing and deployment needs at a large incident. The fire department should have the resources needed to effectively mitigate the incidents that have the highest potential to negatively impact the community. As the actual or potential risk increases, the need for higher numbers of personnel and apparatus also increases. With each type of incident and corresponding risk, specific critical tasks need to be accomplished, and certain numbers and types of apparatus should be dispatched. This section considers the community's identified risks described previously in the report and illustrates the number of personnel that are necessary to accomplish the critical tasks at an emergency.

The number and types of tasks needing simultaneous action will dictate the minimum number of firefighters required to combat different types of fires. In the absence of adequate personnel to perform concurrent action, the commanding officer must prioritize the tasks and complete some in chronological order rather than concurrently. These tasks include:

- Command
- Scene safety
- Search and rescue
- Fire attack
- Water supply
- Pump operation
- Ventilation
- Backup/rapid intervention

Critical task analyses also apply to non-fire type emergencies including medical, technical rescue, and hazardous materials emergencies. Numerous simultaneous tasks must be completed to effectively control an emergency. The department's ability to muster needed numbers of trained personnel quickly enough to make a difference is critical to successful incident outcomes.

The following figure shows one example of critical task resource requirements and recommended number of personnel for fires, irrespective of volunteer or paid status. This is for illustration purposes only and does not necessarily reflect the critical tasks or number of personnel recommended for structure fires.

Figure 94: Example of Critical Task Staffing Analysis based on Risk[16]

Firefighter Personnel Needed Based on Level of Risk				
	Structure Maximum Risk	Structure High Risk	Structure Moderate Risk	Non-Structure Low Risk
Attack Line	4	4	2	2
Back-Up Line		2	2	(2)
Support for Hose Lines/Water Supply		3	2#	
Ventilation	4	2	2	
Search and Rescue	4	2	2	
Forcible Entry/Support		2	2	
Standby/Rapid Intervention Team	4	2	2	
Driver/Pump Operator	1	1	1	1
2nd Apparatus/Ladder Operator		1		
Command	2	1	1	1#
Communications/Safety	1	1	1	
Accountability		1		
Rehabilitation	2			
Building Fire Pump Monitor	(1)			
Attack Line—Floor Above the Fire	2			
Evacuation Management Teams	4			
Elevator Operations Manager	1			
Lobby Operations	1			
Transport Equipment to Staging	2			
EMS Crews	4			
Division/Group Supervisors	4			
Total	**40–41**	**28**	**16–17**	**3–6**

( ) indicates tasks may not be required at all incidents. # indicates task may be completed concurrently with others.

As a comparison—the following figure from NFPA 1710 illustrates the critical staffing for tasks associated with various types of structural fires.

Figure 95: Example of Critical Task Staffing Analysis NFPA 1710

Task	Single-Family Dwelling[1]	Open-Air Strip Mall[2]	Apartment[3]	High-Rise[4]
Command	1	2	2	2
Apparatus Operator	1	2	2	1
Handlines (2 members on each)	4	6	6	4
Support Members	2	3	3	
Victim Search & Rescue Team	2	4	4	4
Ground Ladders/Ventilation	2	4	4	
Aerial Operator (if ladder used)	1	1	1	
Initial Rapid Intervention Team	2	4	4	
Initial Medical Care Component		2	2	
Building Fire Pump Monitor				1
Hose line—Floor Above Fire				2
Rapid Intervention Team				4
Accountability Officers (fire floor & floor above)				4
Evacuation management teams				4
Elevator Operations Manager				1
Incident Safety Officer				1
Interior Staging Manager				1
Member Rehabilitation				2
Vertical Ventilation Crew				4
Lobby Control				1
Transport Equipment				2
External Base Operations				1
EMS Crews with Transport				4
Total Required:	**15**	**28**	**28**	**43**

[1] Typical 2,000 ft., two-story single-family dwelling without a basement and no exposure.

[2] Typical open-air strip mall/shopping center ranging from 13,000–196,000 feet.

[3] Typical 1,200-foot apartment within a three-story, garden-style apartment building.

[4] Building with the highest floor greater than 75 feet above the lowest level of fire department vehicle access.

This methodology may be used to determine the number and type of resources required for any incident type. Four scenarios of commonly encountered emergencies are a non-structural fire, hazardous materials incident, a traffic collision with a trapped victim, and a medical emergency.

Critical Tasking Examples

Critical tasks are those activities that must be conducted early on and in a timely manner by firefighters at emergency incidents in order to control the situation, stop loss, and to perform necessary tasks required for a medical emergency. A fire department is responsible for assuring that responding companies can perform all the described tasks in a prompt, efficient, and safe manner. These are the minimum number of personnel needed by incident type. More personnel will be needed for incidents of increased complexity or size.

The following is an example of the staffing needed to perform critical tasks at an incident. ESCI recommends that the SC-ESD 2 perform its own analysis of the incidents that it responds to and determine the appropriate response necessary.

Figure 96: Example of Critical Tasks for Various Incident Types

Structure Fire (Hydrants)

Task	Number of Personnel
Command	1
Safety	1
Pump Operations	2
Attack Line	3
Back-up Line	3
Search and Rescue	4
Ventilation	4
RIT	5
Other (hydrant)	1
Total	**24**

Structure Fire (No Hydrants)

Task	Number of Personnel
Command	1
Safety	1
Pump Operations	2
Attack Line	3
Back-up Line	3
Search and Rescue	4
Ventilation	4
RIT	5
Tender Operator	1
Total	**24**

Wildland Fire—High Risk

Task	Number of Personnel
Command/Safety	2
Pump Operations/Lookout	2
Attack Line	2
Exposure Line	2
Structure Protection	3
Tender Operator	2
Other (Mop-up, Overhaul, Line)	4
Total	**17**

Wildland Fire—Low Risk

Task	Number of Personnel
Command/Safety	2
Pump Operations/Lookout	2
Attack Line	2
Exposure Line	2
Structure Protection	3
Tender Operator	2
Other (Mop-up, Overhaul, Line)	4
Total	**17**

Hazardous Materials—High Risk

Task	Number of Personnel
Command/Safety	2
Liaison	1
Decontamination	8
Research Support	2
Haz Mat Team leader, recon/intel, entry team, and backup team	10
Total	**23**

Hazardous Materials—Low Risk

Task	Number of Personnel
Command/Safety	2
Liaison	1
Decontamination	8
Research/Support	2
Haz Mat entry team and backup team	4
Total	**17**

Major Medical Response (10+ Patients)

Task	Number of Personnel
Incident Command/ Safety	2
Triage	3
Treatment Manager/ Assistant	2
Patient Care	9
Transport manager/ Assistant	2
Transport	10
MCI Unit	4
Total	**32**

Emergency Medical Aid

Task	Number of Personnel
Patient Management	3
Patient Care	2
Total	**5**

Technical Rescue—Water

Task	Number Of Personnel
Command/Safety	2
Rescue Team	4
Backup Team	4
Patient Care/Transport	2
Rope Tender	2
Upstream Spotter	1
Downstream Team	1
Total	**16**

Motor Vehicle Accident (Trapped)

Task	Number of Personnel
Command/Safety	2
Patient Care	6
Extrication	4
Pump Operator/ Suppression Line	2
Total	**14**

Motor Vehicle Accident (Non-Trapped)

Task	Number of Personnel
Command	1
Patient Care/Extrication	5
Total	**6**

Technical Rescue—Rope

Task	Number Of Personnel
Command/Safety	2
Rescue Team	2
Backup/support team	2
Patient Care/Transport	2
Rigger	2
Attendant	3
Ground Support	4
Edge Person	1
Total	**18**

Technical Rescue—Confined Space

Task	Number Of Personnel
Command/Safety	3
Rescue Team	2
Backup Team	2
Patient Care	2
Attendant	2
Rigger	3
Ground Support	9
Total	**23**

Technical Rescue—Trench

Task	Number Of Personnel
Command/Safety	3
Rescue Team	2
Backup Team	4
Patient Care	2
Rigger	3
Attendant	2
Shoring	6
Ground Support	4
Total	**26**

Aircraft Emergency

Task	Number of Personnel
Command/Safety	2
Aircraft Fire Suppression	12
Pump Operations	2
Attack Line	3
Back-up Line	3
Rescue	4
Emergency Medical Care	4
Water Supply	2
Total	**32**

Establishing resource levels needed for various types of emergencies is a uniquely local decision. Factors influencing local decisions for incident staffing include the type of equipment operated, training levels of responders, operating procedures, geography, traffic, the nature of buildings, and other risks.

SHORT AND MID-TERM STRATEGIES

As mentioned previously in this report, the leadership team for the District—the fire chiefs of the 11 contract departments and the District Fire Chief—reached a consensus of the following critical issues facing the organization, as shown in Figure 97. The recommended short- and mid-term strategies addresses each of these concerns in consideration of anticipated population growth and changes on demographics within the District.

Figure 97: District-Identified Critical Issues

Critical Issue	Description
First	Station Staffing
Second	Cherokee County Response
Third	Training
Fourth	Infrastructure

Staffing

Operational Positions

Staffing is the most critical situation for the District. Given the call volume and available funds, a combination system that includes both paid District personnel and department volunteers appears to be most appropriate. However, it is a challenge to ensure an adequate initial response to arrive in a timely manner with a sufficient number of personnel to perform critical tasks. Volunteers are simply not available at all times, and the number of trained volunteers is an ongoing factor of concern.

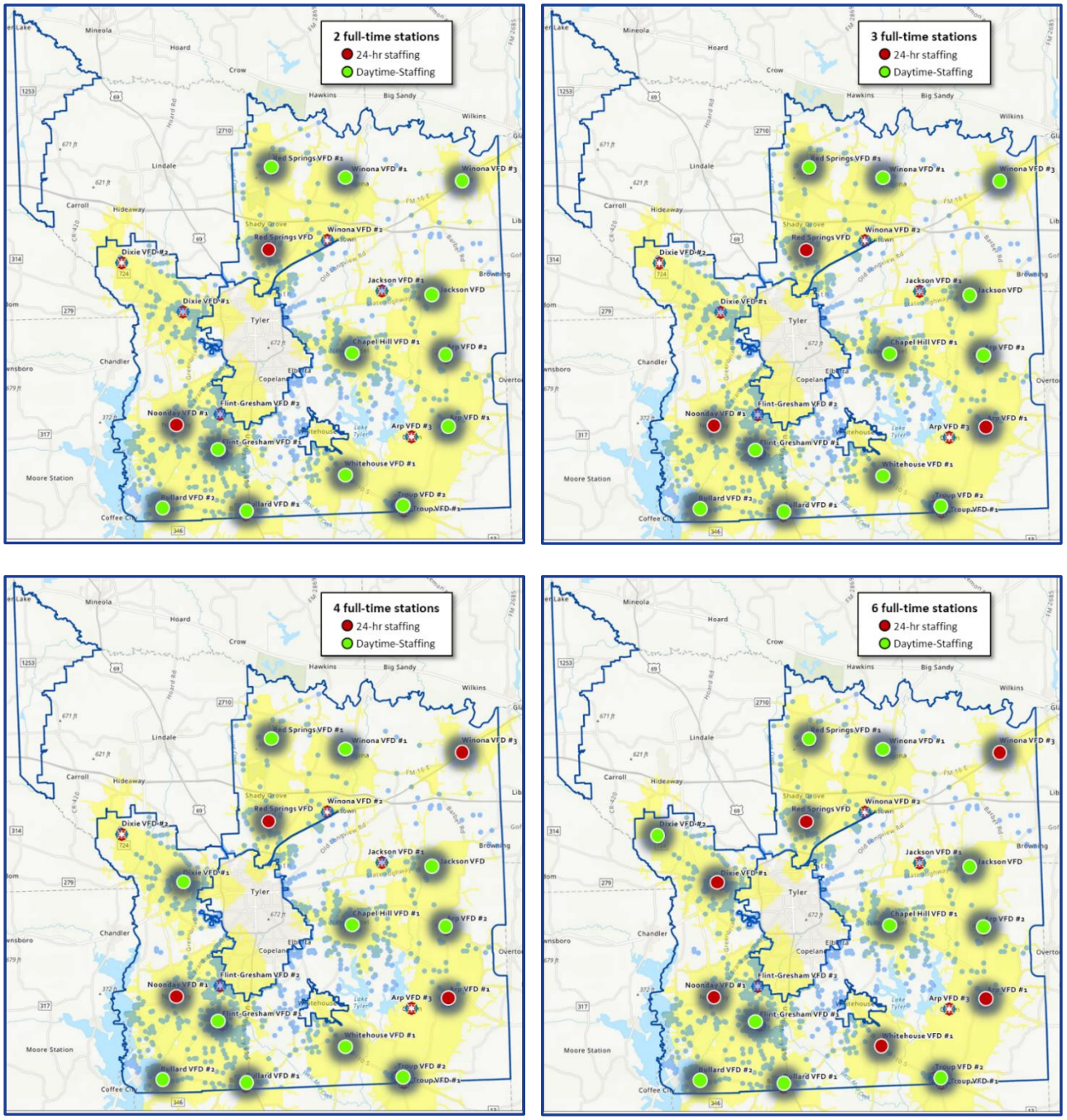
Short-term, the District should continue with its plan to staff stations with two paid personnel and additional, available volunteers based on need and service demand. The number of stations that can be staffed is based on the availability of funding; the size of the available labor pool appears to be sufficient in the short-term.

Given the current available funding, round-the-clock staffing at all departments or stations is not possible at this time. As a result, it is recommended that the District continue its practice of round-the-clock staffing at two or more stations, augmented by daytime staffing at stations strategically located across the District, and staffed by volunteers at all other times. Key factors to assist with the selection of the location of staffed stations should include:

- Balanced coverage with consideration of historic and anticipated service demand;
- Ability to respond quickly to all points within the initial response area;
- Good access to other parts of the District to reduce response times for simultaneous incidents; and
- The availability of automatic or mutual aid to assist with District response in outlying areas.

As the need for paid staff continues to increase, additional stations strategically located throughout the District may be staffed 24/7. Recommended station locations for full-time 24/7 staffing—2-station, 3-station, 4-station, and 6-station—for the short- to mid-term are shown in Figure 98.

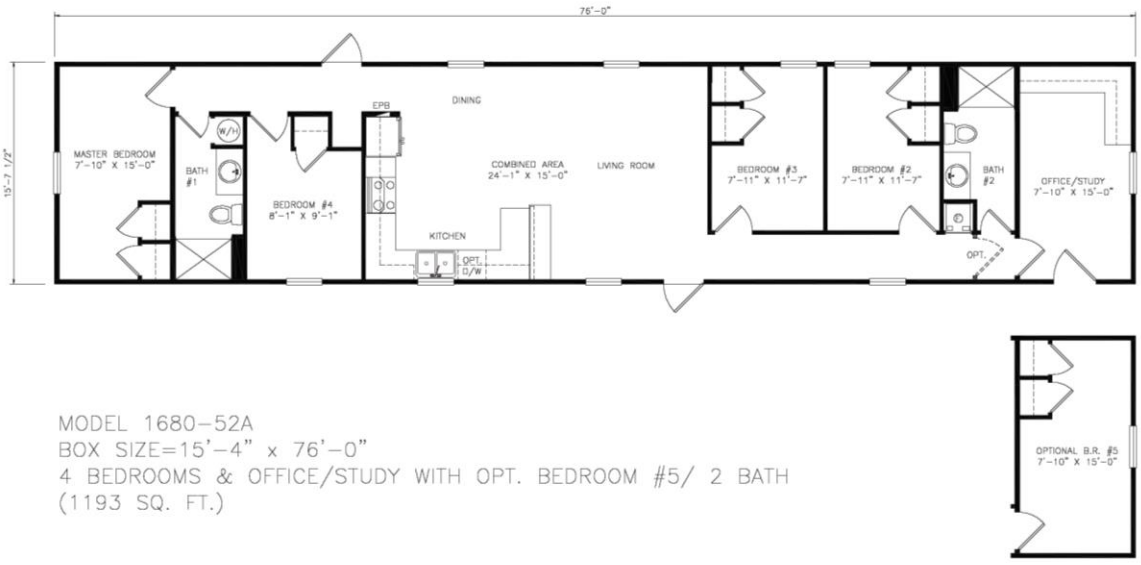
Figure 98: Recommended Locations for Staffed Stations, Short and Mid-Term



Note the selection of Winona Station 3 in the 4- and 6-station full-time staffing plans. Although this location is remote when compared to other stations, it is suggested to provide better coverage in the remote northeast corner of the District while providing good access to IH-20 and the City of Winona.

The lack of crew accommodations is a concern for round-the-clock staffing in many existing stations. This can be overcome through the use of temporary housing. Either trailers or skid-mounted units should be considered, based on needed footprint, available space, anticipated length of use, and cost. Housing units should have full kitchens, communal area, lockers, bedrooms, and bathrooms with showers. Bunk beds should be avoided. One example, with split crew quarters and officer bedroom, is shown in Figure 99.

Figure 99: Example of Temporary Crew Quarters and Accommodations



MODEL 1680-52A
BOX SIZE=15'-4" x 76'-0"
4 BEDROOMS & OFFICE/STUDY WITH OPT. BEDROOM #5/ 2 BATH
(1193 SQ. FT.)

Administrative Positions

Based on a total paid response staff of 55, HR functions performed by staff are within industry guidelines. However, with the addition of approximately 300 volunteer firefighters and the potential for additional paid staff, ESCI recommends that the District hire a full-time, dedicated HR Specialist sometime in the near future. This position would be a 40-hour per week, non-exempt administrative position with full benefits.

Also, the District should consider hiring a part-time Fire/Life-Safety Educator to enhance and coordinate its public education program. Since the proposed position is part-time which is limited to 1,000 hours per year, only limited benefits would be needed. Later, if job functions and workload suggest the need, this position could be converted to a 40-hour per week, non-exempt administrative position with full benefits. Personnel-related expenditures will become the District's most significant expenditure and the ability to better evaluate and analyze those costs is important to making informed decisions regarding future expansion of the service delivery system.

Full-time salaries are projected to be $12.00 per hour based a 53-hour work week for a total of 2,920 hours. Full-time employee benefits include Social Security/Medicare contributions, health insurance and retirement benefits from the Texas County and District Retirement System (TCDRS). Part-time salaries are calculated at $13.00 per hour and no benefits are provided. Both rates are projected to increase 3 percent per year. Volunteer stipends are calculated at $10 per volunteer member response with an average of 10 volunteers responding per incident.

The next figures illustrate the financial Implications of these staffing recommendations.

Figure 100: Projected Employee Costs to be Used for Deployment Models

Employee Costs	Projections					
	Rates	2020	2021	2022	2023	2024
Full-Time Firefighters						
Straight Time	12.00	33,072	34,064	35,086	36,139	37,223
Overtime	18.00	2,952	3,041	3,132	3,226	
Base Compensation		**36,024**	**37,105**	**38,218**	**39,364**	**40,545**
Social Security	6.20%	2,233	2,300	2,370	2,441	2,514
Medicare	1.45%	522	538	554	571	588
Health Insurance		12,000	12,600	13,230	13,892	14,586
Retirement	4.00%	1,441	1,484	1,529	1,575	1,622
Benefits		**16,197**	**16,923**	**17,682**	**18,477**	**19,310**
Total Costs Per FT Firefighter		**52,221**	**54,027**	**55,900**	**57,842**	**59,855**
Number Per Station Per Shift		2	2	2	2	2
Number of Shifts		3	3	3	3	3
Total FT Firefighters Per Station		6	6	6	6	6
Annualized Full-Time Costs Per Station		**313,325**	**324,162**	**335,401**	**347,051**	**359,130**
Part-Time Paid Firefighters						
Part-Time	13.00	13.00	13.39	13.79	14.21	14.63
Hours Per Day		9	9	9	9	9
Days Per Week		5	5	5	5	5
Total Hours Per Week		45	45	45	45	45
Compensation Per Week		**585**	**603**	**621**	**639**	**658**
Social Security	6.20%	36	37	38	40	41
Medicare	1.45%	8	9	9	9	10
Benefits		**45**	**46**	**47**	**49**	**50**
Total Weekly Costs Per Part-Time FF		**630**	**649**	**668**	**688**	**709**
Annualized Part-Time Cost		**32,747**	**33,730**	**34,741**	**35,784**	**36,857**
Volunteer Firefighter Stipends						
Per Call Stipend	10.00	10.00	10.00	10.00	10.00	10.00
Annual Calls		4,090	4,156	4,222	4,290	4,359
Estimated Volunteers Per Response		10	10	10	10	10
Annualized Volunteer Cost		**409,042**	**415,586**	**422,236**	**428,991**	**435,855**

Figure 101: Smith County ESD 2 Projected Cost of Human Resource Specialist

Expenditures	Projected				
	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24
Human Resources Specialist	50,000	51,500	53,045	54,636	56,275
Payroll Taxes	3,825	3,940	4,058	4,180	4,305
Health Insurance	6,000	6,180	6,365	6,556	6,753
Retirement	2,000	2,060	2,122	2,185	2,251
Uniforms	300	309	318	328	338
Total	**$62,125**	**$63,989**	**$65,908**	**$67,886**	**$69,922**

Figure 102: Smith County ESD 2 Projected Cost of 20 Hours per week Fire/Life-Safety Educator

Expenditures	Projected				
	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24
Fire/Life-Safety Educator	20,000	20,600	21,218	21,855	22,510
Payroll Taxes	1,530	1,576	1,623	1,672	1,722
Uniforms	300	309	318	328	338
Total	**$21,830**	**$22,485**	**$23,159**	**$23,854**	**$24,570**

Figure 103: Cost of Four Stations Staffed 24/7 and Seven Stations Staffed Nine Hours a Day, Monday–Friday

Employee Costs	Projected Costs				
	2020	2021	2022	2023	2024
Full-Time Employee Costs Per Station	313,325	324,165	335,401	347,051	359,130
Number of Stations Staffed 24/7	4	4	4	4	4
Full-Time Staffing Costs	**1,253,300**	**1,296,660**	**1,341,604**	**1,388,204**	**1,436,520**
Part-Time Staffing Costs Per Person Per Year	32,747	33,730	34,741	35,784	36,857
Number of Persons Per Station	2	2	2	2	2
Cost Per Station	65,494	67,460	69,482	71,568	73,714
Number of Stations Staffed 9 H/D	7	7	7	7	7
Total Part-Time Staffing Costs	**458,458**	**472,220**	**486,374**	**500,976**	**515,998**
Total Cost For Deployment Model	**1,711,758**	**1,768,880**	**1,827,978**	**1,889,180**	**1,952,518**

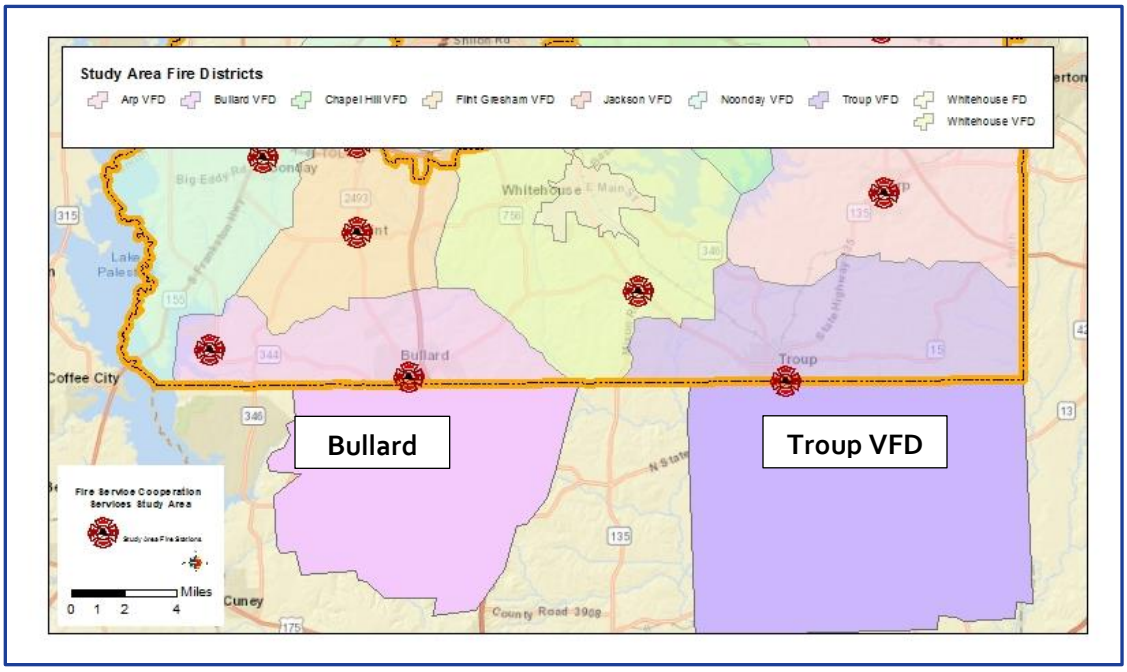
Figure 104: Cost of Six Stations Staffed 24/7 and Five Stations Staffed Nine Hours a Day, Monday–Friday

Employee Costs	Projected Costs				
	2020	2021	2022	2023	2024
Full-Time Employee Costs Per Station	313,325	324,165	335,401	347,051	359,130
Number Of Stations Staffed 24/7	6	6	6	6	6
Full-Time Staffing Costs	**1,879,950**	**1,944,990**	**2,012,406**	**2,082,306**	**2,154,780**
Part-Time Staffing Costs Per Person Per Year	32,747	33,730	34,741	35,784	36,857
Number of Persons Per Station	2	2	2	2	2
Cost Per Station	65,494	67,460	69,482	71,568	73,714
Number of Stations Staffed 9 H/D	5	5	5	5	5
Total Part-Time Staffing Costs	**327,470**	**337,300**	**347,410**	**357,840**	**368,570**
Total Cost For Deployment Model	**2,207,420**	**2,282,290**	**2,359,816**	**2,440,146**	**2,523,350**

Cherokee County Response

Two SC-ESD 2 departments—Bullard VFD and Troup VFD—provide primary fire protection services outside the District's service areas and within Cherokee County as shown in Figure 105.

Figure 105: Bullard and Troup VFD Primary Coverage Areas



The Bullard VFD has been serving Bullard area residents in Smith and Cherokee Counties since 1955. Troup VFD has been serving Troup area residents in both Smith and Cherokee Counties since sometime before World War II—the exact year is unknown. Each department is staffed with both volunteer and career personnel. The Bullard and Troup primary response zones within Cherokee County, both incorporated and unincorporated, were never included within the original boundary of the ESD although this was an option under Texas Law.[17]

The Commissioners Court of Cherokee County contracts with each VFD that provides fire protection in Cherokee County (including Bullard and Troup VFDs); these funds are now paid directly to SC-ESD 2. Current funding for each department is at the flat rate of approximately $22,308 per year. There does not appear to be any particular cost allocation formula used to determine the amount Cherokee County pays for the services it receives.

When two or more communities share in providing fire protection, elected officials must assure that each community assumes only its fair and equitable *pro rata* share of the cost, thereby fulfilling an obligation to act as stewards to the best interest of their respective constituencies. Over the years, there have been concerns voiced by some SC-ESD 2 taxpayers that feel the District is subsidizing primary response into Cherokee County at the expense of Smith County residents. This leads to the suggestion that those who benefit from SC-ESD 2 service should pay in direct proportion to the level of benefit, commonly called the "benefits received" principle.

In the 2017 Agency Evaluation conducted by ESCI, there were several options presented to provide SC-ESD 2 Commissioners with alternatives to the current cost allocation model. These included fixed rate; cost-per-unit—such as cost-per-call, cost-per-population, or some other unit; multiple allocation; and weighted multiple allocation models. Recommendations from that report have been included in the Key Recommendations section of this report.

Training

As is required by State Law, the District provides ongoing in-service training and maintains training records for the paid staff of the District. Training records are periodically audited by the Texas Commission on Fire. The District also offers its in-service training to the members of its contract service providers.

The District relies on each department to provide initial training for its members, but supports training efforts through funding and grants. There is no annual training plan for periodic training that is based on a needs assessment with defined annual program goals. Likewise, there are a limited number of specific delivery objectives that are coordinated at the District level, and there is limited monitoring and audit of department training goals, activities, or performance measures.

There is some pre-fire planning taking place, primarily by paid crews. This information is shared with each fire department and there is a program to begin the centralized documentation and coordination of pre-planning results and firefighter safety concerns. So far, there has been limited training on the pre-fire planning process and how to apply the documented information on an operational basis.

Infrastructure

The District has a good sense of direction regarding infrastructure—fixed facilities, apparatus, emergency and support tools and equipment, and technology. Projects are implemented on a needs-based, pay-as-you-go strategy and this has been beneficial to both the District and the community served. There is an ongoing need to continue the upgrade of existing facilities and the future relocation/expansion of others. The addition of crew quarters in all stations and a new administration/operational support building are priorities.

Capital improvement plans are mostly *ad hoc*, and rely more on addressing potential problem areas rather than on formally-planned and scheduled replacement of capital items. That said, there has been clear improvement in several areas, most notably physical infrastructure, apparatus, and technology.

Recommendations

Staffing

- Conduct focused recruitment in areas where individuals are not looking for an urban department but desire a department with an excellent reputation for service delivery in a rural setting. Utilize social media and recruitment at local, regional, and state EMS conferences. Assign one staff member per station to coordinate.
- Evaluate the feasibility of three-person paid staffing if number of active, certified volunteers falls below numbers needed to consistently provide a minimum of two volunteers per department round-the-clock in higher volume stations and during peak times at lower volume stations.

Cherokee County Response

- Review the current cost allocation process to ensure fair and equitable reimbursement for services provided by the District to others in Cherokee County.
- Consider the adoption of a funding plan that is based on a cost apportionment formula, limited to available funds, that is in accordance with State law, includes input from all interested stakeholders, and is agreeable to all officials affected by the agreement(s).
- Consider a phased approach that includes a short- to mid-term adjustment in the funding process, with a long-term goal of integrating periodic reviews of the funding principles into the District's Master Plan.

Training

- Develop an annual training plan based on periodic training needs assessments with defined annual program goals, objectives, performance measures, and monitoring processes that are based on the needs assessment.
- Establish target hazard lists in order to prioritize the completion of a pre-plan.
- Establish a pre-fire planning program with an assigned coordinator in each station.
- Provide training on the pre-fire planning process and its use.

Other Recommendations

Governance and Administration

- Conduct periodic staff meetings and take minutes for the senior, company, and/or staff meetings.
- Develop member newsletters to ensure that communication is distributed throughout the system.
- Explore and pursue consolidation of all administrative activities into the District's responsibilities to eliminate as much duplication of efforts as possible.

Assessment and Planning

- Develop and publish a strategic plan that includes the review of mission, vision, and value statements to shorten them and ensure that they are meeting the needs for today and the future.
- Review at least one-third of the SOGs/Rules and Regulations document(s) each year to ensure that the complete set is reviewed and revised every three years or less.
- Utilize community involvement with surveys and/or community meetings.
- Continue active participation in LEPC to ensure that hazardous materials sites are monitored and/or reported.
- Establish emergency management and response plans for Continuity of Operations Plans (COOP), a Comprehensive Emergency Management Plans (CEMP) with hazard-specific annexes and attachments, and a Disaster Response and Recovery Plan that includes members' families.

Physical Resources

- Develop a rolling, five-year plan for replacement of apparatus and other vehicles.
- Develop a rolling, five-year plan for replacement of radios and other capital tools and equipment.
- Develop a rolling, ten-year plan for replacement of stations and other facilities.
- Consider implementing closed-circuit television to reach outlying stations (Fire Chief's monthly address to personnel, other remote meetings).
- Consider adding exhaust removal systems and the ability to clean contaminated clothing in all stations as fiscal restraints allow.

Operational Programs

- Continue with current staffing models and gradually increase to full-time, 24/7 coverage with combination crews of two paid personnel and two or more volunteer personnel.
- Consider guidelines and specific SOGs relating to fireground operations prior to the arrival of an effective response force (ERF) that direct whether the engine can be placed in pump and the two-person crew can make entry into the structure.

Human Resources

- Develop and implement a comprehensive annual screening process that can help identify individuals who may be at higher risk for a cardiac event on the fireground.
- Accumulate all costs related to personnel in one section of the financial reporting system including sections for administrative salaries, fire department operations salaries, part-time paid costs, volunteer stipends, overtime charges, and a detail of benefits.
- Compare employee benefits programs for similar systems and establish policy positions for leave time, workers' compensation and other insurance costs, payroll taxes (FICA/Medicare), retirement cost sharing, health, dental and life insurance costs, and other employee benefits.
- Develop an enhanced cancer prevention program that begins with policies minimizing individuals from wearing contaminated personal clothing back to work or home.

External Systems

- Develop options for auto-aid agreements, resource-sharing, or consolidation with Smith County ESD 1, the City of Whitehouse, and/or others.
- Establish automatic aid agreements with surrounding communities or follow State of Texas 12-hour mutual aid policy.
- Consider the mid-range goal of becoming a regional maintenance facility. This would result in improved maintenance services to neighboring agencies and a revenue stream to support future growth.
- During short and mid-term planning, consider increasing personnel and regional opportunities relating to the fleet services program.

RECOMMENDED LONG-TERM STRATEGY

It is anticipated that the critical issues mentioned previously will continue to play an important role in the District's development of a long-term strategy for improvement. Rather than restate current conditions and issues, this section will identify long-term recommendations for consideration by the District. Some of these recommendations assume that short- to mid-term recommendations have been implemented and have provided some measure of positive results. Long-term recommendations are contingent upon anticipated population growth, changes on demographics, and the availability of funding.

Recommendations

Staffing

- Continue focused recruitment for members, both paid and volunteer, with a strong customer service motivation in a rapidly-developing, yet rural setting.
- Evaluate the feasibility of three-person paid staffing if required by diminishing number of active, trained volunteers falls below numbers needed to meet service needs and expectations.

Cherokee County Response

- Continue to monitor the cost allocation process to ensure fair and equitable reimbursement for services provided by the District to others in Cherokee County.
- Implement a funding plan that is based on a cost apportionment formula, limited to available funds, that is in accordance with State law, includes input from all interested stakeholders, and is agreeable to all officials affected by the agreement(s).

Training

- Review and update the annual training plan, needs assessment, defined annual program goals, objectives, performance measures, and monitoring processes.
- Update target hazard lists in order to prioritize the completion of a pre-plan.
- Continue the pre-fire planning program with an assigned coordinator in each station.
- Continue training programs on the pre-fire planning process and its use.

Other Recommendations

Governance and Administration

- Continue regular staff meetings, complete with minutes for all senior, company, and/or staff meetings.
- Continue member newsletters to ensure that communication is distributed throughout the system.
- Continue to explore ways to improve the efficiency and effectiveness of administrative activities within the District.

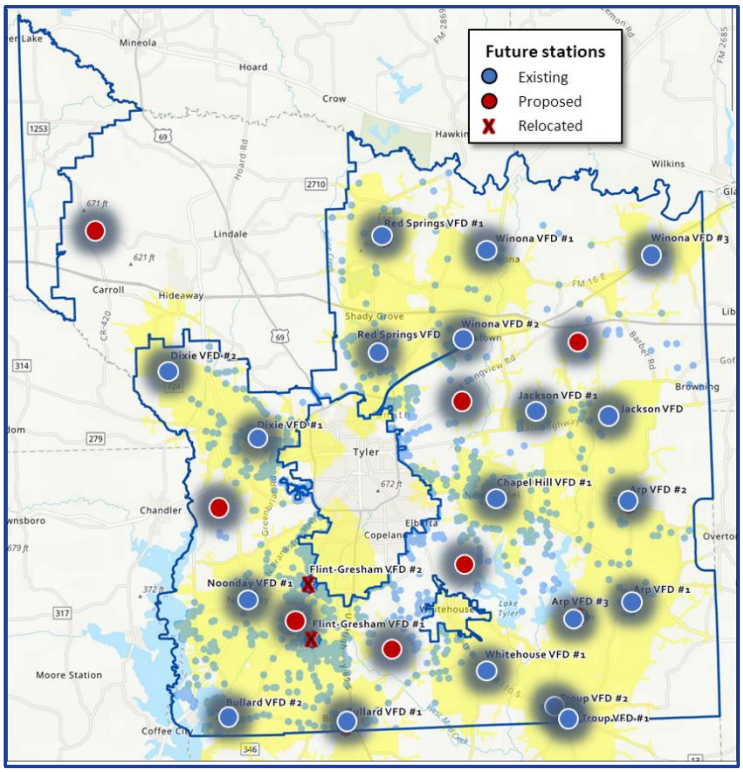
Assessment and Planning

- Update the strategic plan to ensure it continues to meet the needs for today and the future.
- Continue review at least one-third of all SOGs/Rules and Regulations each year.
- Continue and expand community involvement with advisory committees, surveys, and/or meetings throughout the community.
- Continue active participation in LEPC.
- Update emergency management and response plans.

Physical Resources

- Formalize a funding strategy for all capital improvements.
- Update rolling, long-term plans for replacement of apparatus and other vehicles; radios and other capital tools and equipment; and stations and other facilities.
- Evaluate the need for additional station locations and other facilities throughout the District.

Figure 106: Potential New Station Locations

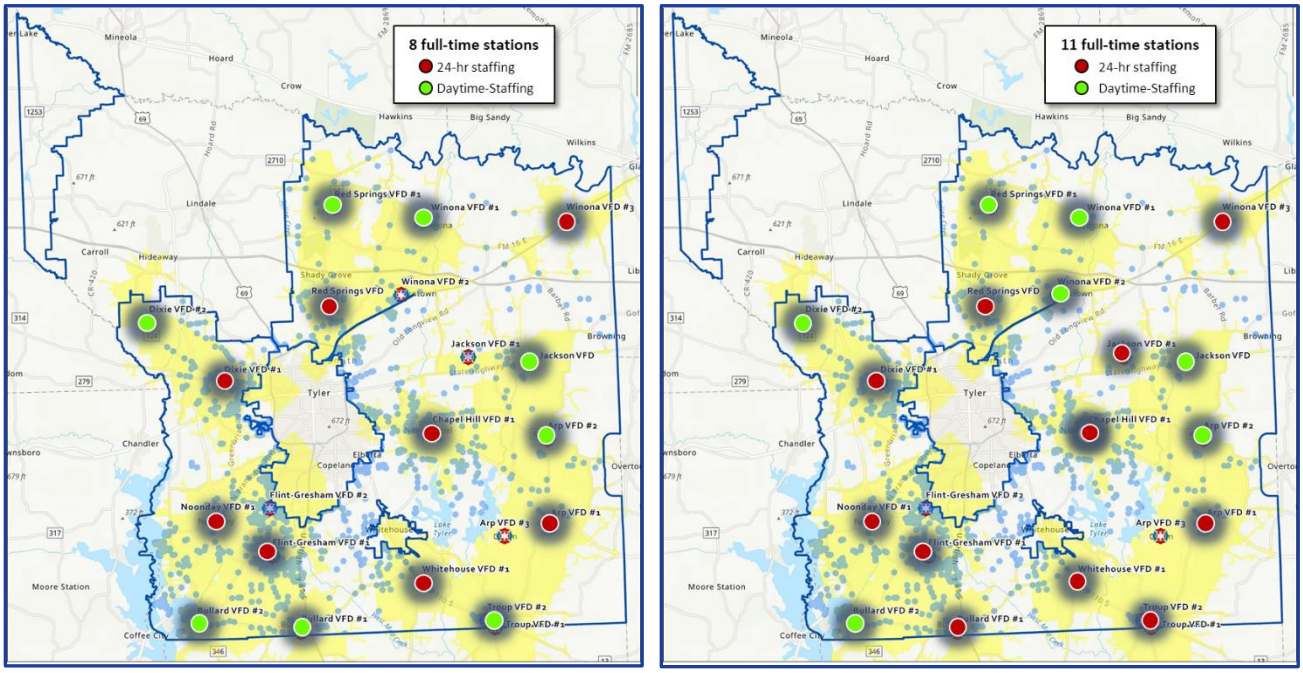


- Relocate the administration/operational support building to the Red Springs 2 station complex.
- Finalize the design and construction of a regional training facility at the Red Springs 2 station complex.
- Continue use of closed-circuit television CCTV for training, meetings, security, and other purposes.
- Continue program to adding exhaust removal systems and the ability to clean contaminated clothing in all stations as fiscal restraints allow.

Operational Programs

- Continue with current staffing models and gradually increase to full-time, 24/7 coverage with combination crews of two paid personnel and two or more volunteer personnel in all 11 departments as shown in Figure 107.

Figure 107: Recommended Locations for 24/7 Staffed Stations, Long-Term



- Review and update guidelines and SOGs relating to fireground operations and the determination/use of an effective response force (ERF).
- Explore possibility of shared resource programs with SC-ESD 1 to improve coverage in remote, north-west corner of the District.

Human Resources

- Continue with a comprehensive annual screening process for cardiac risk.
- Continue to streamline the financial reporting system relating to personnel costs.
- Continue to compare employee benefits programs for similar systems to ensure policy positions for leave time, workers' compensation and other insurance costs, payroll taxes (FICA/Medicare), retirement cost sharing, health, dental and life insurance costs, and other employee benefits are competitive and attractive to current and potential members and staff.
- Continue with an enhanced cancer prevention program.

External Systems

- Review existing and needed auto-aid agreements, resource-sharing, and consolidation efforts.
- Continue with regional maintenance facilities and fleet services programs.

Financial Impact of Long-Term Strategies

The following figures provide additional details about the financial impact of the recommendations contained in the long-term strategies.

Staffing Costs

Figure 108: Cost of Eight Stations Staffed 24/7 and Three Stations Staffed Nine Hours a Day, Monday–Friday

Employee Costs	Projected Costs				
	2020	2021	2022	2023	2024
Full-Time Employee Costs Per Station	313,325	324,165	335,401	347,051	359,130
Number Of Stations Staffed 24/7	8	8	8	8	8
Full-Time Staffing Costs	**2,506,600**	**2,593,320**	**2,683,208**	**2,776,408**	**2,873,040**
Part-Time Staffing Costs Per Person Per Year	32,747	33,730	34,741	35,784	36,857
Number Of Persons Per Station	2	2	2	2	2
Cost Per Station	65,494	67,460	69,482	71,568	73,714
Number Of Stations Staffed 9 H/D	3	3	3	3	3
Total Part-Time Staffing Costs	**196,482**	**202,380**	**208,446**	**214,704**	**221,142**
Total Cost For Deployment Model	**2,703,082**	**2,795,700**	**2,891,654**	**2,991,112**	**3,094,182**

Figure 109: Cost of Eleven Stations Staffed 24/7

Employee Costs	Projected Costs				
	2020	2021	2022	2023	2024
Full-Time Employee Costs Per Station	313,325	324,165	335,401	347,051	359,130
Number Of Stations Staffed	11	11	11	11	11
Full-Time Staffing Costs	**3,446,575**	**3,565,815**	**3,689,411**	**3,817,561**	**3,950,430**
Total Cost For Deployment Model	**3,446,575**	**3,565,815**	**3,689,411**	**3,817,561**	**3,950,430**

Figure 110: Cost of Twenty-One Stations Staffed 24/7

Employee Costs	Projected Costs				
	2020	2021	2022	2023	2024
Full-Time Employee Costs Per Station	313,325	324,165	335,401	347,051	359,130
Number Of Stations Staffed	21	21	21	21	21
Full-Time Staffing Costs	**6,579,825**	**6,807,465**	**7,043,421**	**7,288,071**	**7,541,730**
Total Cost For Deployment Model	**6,579,825**	**6,807,465**	**7,043,421**	**7,288,071**	**7,541,730**

Net Cash Flow Projections

The following figure shows the impact of the ESCI recommendations on the finances of the District beginning with the Net Cash Flow Projections.

Figure 111: Adjusted Projected Cash Flow with ESCI Recommendations

Description	Adjusted Budget	Projected				
	FY 18/19	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24
Total Revenues	9,707,470	5,783,824	6,005,713	6,236,477	6,476,471	6,726,065
Total Expenditures	**7,252,808**	**8,152,466**	**5,867,531**	**7,016,445**	**6,169,952**	**6,328,196**
Net Cash Flow (Deficit)	2,454,662	(2,368,642)	137,642	(779,968)	306,519	397,869
Human Resources Director		62,125	63,989	65,908	67,886	69,922
Fire/Life Safety Educator, Part-time		21,830	22,485	23,159	23,854	24,570
24/7 Staffing, Dixie		147,279	150,618	154,058	157,600	161,249
24/7 Staffing, Winona		147,279	150,618	154,058	157,600	161,249
Adjusted Cash Flow (Deficit)	**2,454,662**	**(2,747,155)**	**(250,068)**	**(1,177,151)**	**(100,421)**	**(19,121)**
Beginning Cash	2,115,536	4,570,198	1,823,043	1,572,975	(395,824)	(496,245)
Ending Cash	**4,570,198**	**1,823,043**	**1,572,975**	**(395,824)**	**(496,245)**	**(515,366)**

Note the potential negative cash balance beginning in FY 21/22 and continuing forward. This suggests budget adjustments and/or additional source of revenue may be required given these projections.

Effect of Adding a Third Person to Paid Staffing, 4-Station Model

As described in the Response Performance section, SC-ESD 2 does not possess sufficient resources to respond to fire emergencies using paid or volunteer staff alone; both volunteers and paid personnel are required. While the data suggests there is a delay in assembling an effective response force, it does not provide enough information to account for individual firefighter or command staff response and arrival times.

For comparative purposes only, ESCI evaluated the current deployment model of two-person paid response to fire incidents and the length of time it took to assemble an effective firefighting force with consideration of "two-in/two-out" for entering areas deemed immediately dangerous to life or health (IDLH). The impact of adding a third firefighter to each of four stations on each shift is shown in the following figure.

Figure 112: Cost of Adding a Third Firefighter Position to Each Shift for Four Station Locations

Expenditures	Projected				
	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24
Firefighter Salary	35,790	36,863	37,969	39,108	40,282
Number Per Shift	4	4	4	4	4
Cost Per Shift	**143,159**	**147,453**	**151,877**	**156,433**	**161,126**
Number of Shifts	3	3	3	3	3
Total Compensation Cost	**429,476**	**442,360**	**455,631**	**469,300**	**483,379**
Payroll Taxes	32,855	33,841	34,856	35,901	36,978
Health Insurance	72,000	72,000	72,000	72,000	72,000
Retirement	17,179	17,694	18,225	18,772	19,335
Total	**$551,510**	**$565,895**	**$580,712**	**$595,973**	**$611,692**

As indicated in Figure 112, current revenues are insufficient to provide funding for all of the ESCI recommendations. The District should consider revenue enhancements that may be available to offset a portion, if not all, of the annual deficit cash flows indicated in the previous figures. Three possibilities to be considered, either individually or in concert with each other, are:

- **Option 1**: Increasing the property tax to the $0.10 maximum rate versus the current $0.084648;
- **Option 2:** Seeking and gaining approval to collect a sales and use tax of 1.5 percent in unincorporated areas and 1 percent in participating incorporated areas; and
- **Option 3:** Financing the cost of new buildings and incurring debt service versus the current pay-as-you-go strategy of full cash payment form reserve funds.

The following figure incorporates those concepts and amortizes the debt over a ten-year period at an interest rate of 4 percent.

Figure 113: Smith County ESD 2 Potential Revenue Sources, FY 19/20–FY 23/24

Revenues	Projected				
	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24
Increase Tax Rate to $0.10/$100					
Projected Taxable Valuation	6,755,944,095	7,026,181,858	7,307,229,133	7,599,518,298	7,903,499,030
Tax Rate per $100	$0.10	$0.10	$0.10	$0.10	$0.10
Assessed Property Taxes	6,755,944	7,026,182	7,307,229	7,599,518	7,903,499
Collection Rate	97%	97%	97%	97%	97%
Projected Property Tax Revenue	6,553,266	6,815,396	7,088,012	7,371,533	7,666,394
Original Projected Tax Revenue	5,547,208	5,769,097	5,999,861	6,239,855	6,489,449
Increase in Property Tax Revenue	**1,006,057**	**1,046,300**	**1,088,152**	**1,131,678**	**1,176,945**
Sales Tax					
Outside the City Limits of Noonday or Chapel Hill	75,891,588	76,650,504	77,417,009	78,191,179	78,973,091
Sales Tax Rate	1.50%	1.50%	1.50%	1.50%	1.50%
Sales Tax from Unincorporated County	1,138,374	1,149,758	1,161,255	1,172,868	1,184,596
Inside City Limits of Noonday and Chapel Hill	7,511,556	7,586,672	7,662,538	7,739,164	7,816,555
Sales Tax Rate from Cities	0.50%	0.50%	0.50%	0.50%	0.50%
Sales Tax from Cities	37,558	37,933	38,313	38,696	39,083
Total Projected Sales Tax Revenues	**1,175,932**	**1,187,691**	**1,199,568**	**1,211,564**	**1,223,679**
Use of Debt					
Financing for Building Construction					
Debt Service 10 years @ 3.75%		(487,045)	(487,045)	(487,045)	(487,045)
Net Use of Debt		(487,045)	(487,045)	(487,045)	(487,045)
Projected Increase in Cash Flow	**2,181,989**	**1,746,946**	**1,800,675**	**1,856,197**	**1,913,579**

Using the Adjusted Cash Flow (Deficit) amounts contained in Figure 111 as a starting point and adjusting those amounts with the Projected Increase in Cash Flow from Figure 113 results in positive cash flow throughout the five year projection period and maintains cash flow reserves in excess of the required amounts for the Emergency Funds and the Revenue Shortfall Fund.

The following figure shows the effect of the various revenue enhancements available to the District.

Figure 114: Smith County ESD 2 Adjusted Projected Cash Flow with Potential Revenue Sources, FY 19/20–FY 23/24

Description	Projected				
	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24
Net Increase (Decrease) in Cash (from Figure 111)	**(2,747,155)**	**(250,068)**	**(1,177,151)**	**(100,421)**	**(19,121)**
Projected Potential Revenue (from Figure 113)	2,181,989	1,746,946	1,800,675	1,856,197	1,913,579
Adjusted Increase (Decrease) in Cash	**(565,166)**	**1,496,878**	**623,524**	**1,755,776**	**1,894,458**
Beginning Cash	4,570,198	4,005,032	5,501,910	6,125,434	7,881,210
Ending Cash	4,005,032	5,501,910	6,125,434	7,881,210	9,775,668
Emergency Reserve	500,000	500,000	500,000	500,000	500,000
Income Shortfall Reserve	468,513	468,513	468,513	468,513	468,513
Minimum Required Reserves	968,513	968,513	968,513	968,513	968,513
Excess Reserves	**$3,036,519**	**$4,533,397**	**$5,156,921**	**$6,912,697**	**$8,807,155**

From this it may be concluded that the additional funding supplied by potential revenue sources, coupled with ongoing and careful monitoring of expenditures, may result in the favorable financial position that is necessary to support ongoing operational costs and provide funding for long-term capital projects and improvements.

APPENDIX A: FACILITY DESCRIPTIONS

- Fleet maintenance included
- Admin building included
- Arp 1 included, scheduled for replacement
- Arp 2 included
- Arp 3 included
- Bullard 1 included
- Bullard 2 included
- Chapel Hill 1 included
- Dixie 1 included
- Dixie 2 included
- Flint Gresham 1 included, scheduled for replacement
- Flint Gresham 2 included
- Jackson Heights 1 included
- Jackson Heights 2 included
- Noonday 1 included
- Red Springs 1 included
- Red Springs 2 included
- Troup 1 included
- Troup 2 located in Cherokee County, not included in this study
- Troup 3 included, apparatus storage only
- Whitehouse 1 included
- Winona 1 included
- Winona 2 included
- Winona 3 included

Figure 115: SC-ESD 2 Fleet Maintenance Facility

The SC-ESD 2 Fleet Maintenance Facility is an excellent addition to the system. Located on a site that also is the location of Red Springs Station 2. The maintenance facility is over 8000 square feet, and the site has excellent potential for future growth. Based on the critical function of the facility ESCI recommends the installation of an emergency generator. Additionally, SC-ESD 2 should consider wellness initiatives and install an exhaust removal system.

Basic Structure	
Construction type	Full Metal Clad
Date Built	1980
Last Remodel Date	N/A
Special Considerations ADA, Gender Appropriate, etc.	No
Overall Condition, Excellent, Good, Fair, Poor	Good
Utility Services, Gas (N or P), Electric	Electric – Propane
Auxiliary Power, KW, Fuel Type	No
Foundation	Slab on Grade
Green or LEEDS Certified	No
Square Footage	
Conditioned	1,200
Apparatus Room and Accessory Use	6,800
Total	8,000
Facilities Available	
Sleeping area	No
Locker, Showers	Yes
Kitchen, Dayroom	Kitchenette, Day Room
Training, Meeting Room	Dayroom and Bay
Office Space	Yes
Washer/Dryer/Extractor	No
Fitness Area	No
Protection Systems	
Fire Protection Sprinklers	Yes
Smoke Detection, Single Station, Monitored, Etc.	Yes
Nitrous Dioxide, Carbon Monoxide, or other detection	No
Apparatus Exhaust Removal System	No
Other Fixed Fire Protection Systems	No
Exterior Features	
Apparatus Fueling System	1700 gal
Parking	Yes
Fire Hydrant	Same as Block
Building Access Control, Key, Card, FOB, etc.	FOB
Video Surveillance System	Yes

Figure 116: SC-ESD 2 Administration Building

The SC-ESD 2 Administration Building is a building leased by the District. Built around 1980, it is in poor condition, is too small to meet District needs (current or future), and there is no potential for future growth. Based on the function of the facility, ESCI recommends that the District should begin plans to relocate to, or build, a facility that is more suitable for long-term use. In the short-term, the District should consider the installation of a generator to provide back-up power in the event of an emergency.

Basic Structure	
Construction type	Full Metal Clad
Date Built	1980
Last Remodel Date	N/A
Special Considerations ADA, Gender Appropriate, etc.	No
Overall Condition, Excellent, Good, Fair, Poor	Poor
Utility Services, Gas (N or P), Electric	Electric
Auxiliary Power, KW, Fuel Type	No
Foundation	Slab on Grade
Green or LEEDS Certified	No
Square Footage	
Conditioned	2,500
Apparatus Room and Accessory Use	0
Total	2,500
Facilities Available	
Sleeping area	No
Locker, Showers	No
Kitchen, Dayroom	No
Training, Meeting Room	Yes, conference room
Office Space	Yes
Washer/Dryer/Extractor	No
Fitness Area	No
Protection Systems	
Fire Protection Sprinklers	No
Smoke Detection, Single Station, Monitored, Etc.	Yes
Nitrous Dioxide, Carbon Monoxide, or other detection	No
Apparatus Exhaust Removal System	No
Other Fixed Fire Protection Systems	No
Exterior Features	
Apparatus Fueling System	No
Parking	Limited
Fire Hydrant	Same as Block
Building Access Control, Key, Card, FOB, etc.	FOB
Video Surveillance System	Yes

Figure 117: Arp VFD Station 1

The Arp Fire Station 1 constructed in 2006 is approximately 3,600 square feet in space. The facility has three bays fronting the highway and three fronting the alley. The apparatus housed in the bays include one engine, a tanker, brush truck, and a rescue. No overnight accommodations are provided. The building is in poor condition, and regular preventive maintenance has been performed. The station does not present any immediate and significant maintenance concerns. The vacant lot abutting the building is owned by the ESD making a future expansion possible. The operational needs of the department have outgrown the building.

Basic Structure	
Construction type	Full Metal Clad – Brick Veneer
Date Built	2006
Last Remodel Date	N/A
Special Considerations ADA, Gender Appropriate, etc.	No
Overall Condition, Excellent, Good, Fair, Poor	Poor
Utility Services, Gas (N or P), Electric	Gas – Electric
Auxiliary Power, KW, Fuel Type	None
Foundation	Slab on Grade
Green or LEEDS Certified	No
Square Footage	
Conditioned	900
Apparatus Room and Accessory Use	2,700
Total	3,600
Facilities Available	
Sleeping area	No
Locker, Showers	Yes
Kitchen, Dayroom	Kitchenette, combined
Training, Meeting Room	Dayroom and bay
Office Space	No
Washer/Dryer/Extractor	No
Fitness Area	No
Protection Systems	
Fire Protection Sprinklers	No
Smoke Detection, Single Station, Monitored, Etc.	Single Station
Nitrous Dioxide, Carbon Monoxide, or other detection	No
Apparatus Exhaust Removal System	No
Other Fixed Fire Protection Systems	No
Exterior Features	
Apparatus Fueling System	Yes
Parking	Very limited, poor
Fire Hydrant	No
Building Access Control, Key, Card, FOB, etc.	FOB
Video Surveillance System	Yes

Figure 118: Arp VFD Station 2

The Arp Fire Station 2 constructed in 2008 is approximately 5,400 square feet in space. The facility has three bays fronting the highway. The apparatus housed in the bays include one Engine, a Tanker, Brush Truck and a Rescue. No overnight accommodations are provided. The building is in good condition, and regular preventive maintenance has been performed. The station does not present any immediate and significant maintenance concerns.

Note: Since this picture was taken, the parking lot has been expanded and paved with concrete.

Basic Structure	
Construction type	Full Metal Clad
Date Built	2008
Last Remodel Date	N/A
Special Considerations ADA, Gender Appropriate, etc.	No
Overall Condition, Excellent, Good, Fair, Poor	Good
Utility Services, Gas (N or P), Electric	Electric – Propane
Auxiliary Power, KW, Fuel Type	20 KW
Foundation	Slab on Grade
Green or LEEDS Certified	No
Square Footage	
Conditioned	1,800
Apparatus Room and Accessory Use	3,600
Total	5,400
Facilities Available	
Sleeping area	No
Locker, Showers	Yes
Kitchen, Dayroom	Kitchenette, combined
Training, Meeting Room	Dayroom and bay
Office Space	No
Washer/Dryer/Extractor	No
Fitness Area	In dayroom
Protection Systems	
Fire Protection Sprinklers	No
Smoke Detection, Single Station, Monitored, Etc.	Single Station
Nitrous Dioxide, Carbon Monoxide, or other detection	No
Apparatus Exhaust Removal System	No
Other Fixed Fire Protection Systems	No
Exterior Features	
Apparatus Fueling System	No
Parking	Limited
Fire Hydrant	Pony (blow-off)
Building Access Control, Key, Card, FOB, etc.	FOB
Video Surveillance System	Yes

Figure 119: Arp VFD Station 3

The Arp Fire Station 3 constructed in 2008 is approximately 1,600 square feet in space. The facility has two bays fronting a side road. The apparatus housed in the bays includes one engine. There is also room for other apparatus. No overnight accommodations are provided. The building is in good condition, and regular preventive maintenance has been performed. The station does not present any immediate and significant maintenance concerns.

Basic Structure	
Construction type	Full Metal Clad
Date Built	2008
Last Remodel Date	N/A
Special Considerations ADA, Gender Appropriate, etc.	No
Overall Condition, Excellent, Good, Fair, Poor	Good
Utility Services, Gas (N or P), Electric	Electric
Auxiliary Power, KW, Fuel Type	No
Foundation	Slab on Grade
Green or LEEDS Certified	No
Square Footage	
Conditioned	0
Apparatus Room and Accessory Use	1,600
Total	1,600
Facilities Available	
Sleeping area	No
Locker, Showers	No
Kitchen, Dayroom	No
Training, Meeting Room	Bay
Office Space	No
Washer/Dryer/Extractor	No
Fitness Area	No
Protection Systems	
Fire Protection Sprinklers	No
Smoke Detection, Single Station, Monitored, Etc.	Single Station
Nitrous Dioxide, Carbon Monoxide, or other detection	No
Apparatus Exhaust Removal System	No
Other Fixed Fire Protection Systems	No
Exterior Features	
Apparatus Fueling System	No
Parking	Limited, gravel base
Fire Hydrant	No
Building Access Control, Key, Card, FOB, etc.	FOB
Video Surveillance System	No

Figure 120: Bullard VFD, Station 1

The Bullard Station 1 constructed in the 1990s is approximately 6,500 square feet. The apparatus housed in the bays include an engine, a tanker, and a brush truck. The ESD has a dozer/plow on a transport in the bays. An SCBA compressor is located in the building. UT Health East Texas EMS leases space for their operation of an ambulance with crew. Overnight accommodations are provided for two. While the building is in good condition, due to age, additional future maintenance issues can be anticipated. The station does not appear to present any current significant maintenance concerns.

Basic Structure	
Construction type	Full Metal Clad – Brick Veneer
Date Built	1990s
Last Remodel Date	
Special Considerations ADA, Gender Appropriate, etc.	No
Overall Condition, Excellent, Good, Fair, Poor	Good
Utility Services, Gas (N or P), Electric	Gas – Electric
Auxiliary Power, KW, Fuel Type	35 KW
Foundation	Slab on Grade
Green or LEEDS Certified	No
Square Footage	
Conditioned	2,000
Apparatus Room and Accessory Use	5,500
Total	6,500
Facilities Available	
Sleeping area	Two Beds
Locker, Showers	Yes
Kitchen, Dayroom	Combined
Training, Meeting Room	Bays and Dayroom
Office Space	Yes
Washer/Dryer/Extractor	Residential
Fitness Area	In Bay
Protection Systems	
Fire Protection Sprinklers	No
Smoke Detection, Single Station, Monitored, Etc.	Single Station
Nitrous Dioxide, Carbon Monoxide, or other detection	No
Apparatus Exhaust Removal System	No
Other Fixed Fire Protection Systems	No
Exterior Features	
Apparatus Fueling System	Yes
Parking	Adequate
Fire Hydrant	No
Building Access Control, Key, Card, FOB, etc.	FOB
Video Surveillance System	Yes

Figure 121: Bullard VFD, Station 2

The Bullard Station 2 constructed in 1980s is approximately 3,200 square feet. The apparatus housed in the bays include an engine, a tanker, and a brush truck. UT Health EMS recently vacated space leased for its operation of an ambulance with crew. Overnight accommodations are provided for two. The ESD boat is located in the former ambulance bay. While the building is in fair condition, due to age, additional future maintenance issues can be anticipated. The station does not appear to present any current significant maintenance concerns.

Basic Structure	
Construction type	Full Metal Clad
Date Built	1980s
Last Remodel Date	2009
Special Considerations ADA, Gender Appropriate, etc.	No
Overall Condition, Excellent, Good, Fair, Poor	Good
Utility Services, Gas (N or P), Electric	Propane Gas – Electric
Auxiliary Power, KW, Fuel Type	No – On Order
Foundation	Slab on Grade
Green or LEEDS Certified	No
Square Footage	
Conditioned	1,000
Apparatus Room and Accessory Use	2,200
Total	3,200
Facilities Available	
Sleeping area	Two Beds
Locker, Showers	Yes
Kitchen, Dayroom	Combined
Training, Meeting Room	Bays and Dayroom
Office Space	Limited
Washer/Dryer/Extractor	Residential
Fitness Area	In Bay – Limited Equipment
Protection Systems	
Fire Protection Sprinklers	No
Smoke Detection, Single Station, Monitored, Etc.	Single Station
Nitrous Dioxide, Carbon Monoxide, or other detection	No
Apparatus Exhaust Removal System	No
Other Fixed Fire Protection Systems	No
Exterior Features	
Apparatus Fueling System	Yes
Parking	Adequate
Fire Hydrant	No
Building Access Control, Key, Card, FOB, etc.	FOB
Video Surveillance System	Yes

Figure 122: Chapel Hill VFD, Station 1

The new Chapel Hill Station was recently completed. It has approximately 6,600 square feet of space. The apparatus housed in the bays includes an engine, a tanker, and a brush truck. A multi-purpose room is included to provide for community meetings and departmental training. The new station does not appear to present any significant maintenance concerns. The old building is to be gutted and remolded for apparatus storage and the SCBA compressor.

Basic Structure	
Construction type	Full Metal Clad
Date Built	2018
Last Remodel Date	N/A
Special Considerations ADA, Gender Appropriate, etc.	Yes
Overall Condition, Excellent, Good, Fair, Poor	Excellent
Utility Services, Gas (N or P), Electric	Gas – Electric
Auxiliary Power, KW, Fuel Type	35 KW Natural Gas
Foundation	Slab on Grade
Green or LEEDS Certified	No
Square Footage	
Conditioned	3,600
Apparatus Room and Accessory Use	3,000 plus Additional Mezzanine
Total	6,600
Facilities Available	
Sleeping area	Yes
Locker, Showers	Yes
Kitchen, Dayroom	Yes – Separated
Training, Meeting Room	Large – Community Room
Office Space	Yes
Washer/Dryer/Extractor	Residential
Fitness Area	Interior
Protection Systems	
Fire Protection Sprinklers	No
Smoke Detection, Single Station, Monitored, Etc.	Commercial System
Nitrous Dioxide, Carbon Monoxide, or other detection	No
Apparatus Exhaust Removal System	No
Other Fixed Fire Protection Systems	Yes, Range Hood
Exterior Features	
Apparatus Fueling System	Gasoline and Diesel
Parking	Adequate
Fire Hydrant	Yes
Building Access Control, Key, Card, FOB, etc.	FOB
Video Surveillance System	Yes

Figure 123: Dixie VFD, Station 1

The Dixie Station 1 has been recently remodeled and is now capable of housing crews for 24-hour shifts. Current floor plan includes an office that will need to be converted to a bunkroom. There will be limited facilities for male/female crews. The projected utilization as a 24-hour staffed station is April 2020.

Basic Structure	
Construction type	Full Metal Clad
Date Built	1973
Last Remodel Date	Underway
Special Considerations ADA, Gender Appropriate, etc.	No
Overall Condition, Excellent, Good, Fair, Poor	Fair
Utility Services, Gas (N or P), Electric	Natural Gas – Electric
Auxiliary Power, KW, Fuel Type	35 KW Natural Gas
Foundation	Slab on Grade
Green or LEEDS Certified	No
Square Footage	
Conditioned	1,400
Apparatus Room and Accessory Use	3,100 Annex Additional 2,500
Total	7,000
Facilities Available	
Sleeping area	Sleeping Quarters in Existing Office
Locker, Showers	Yes
Kitchen, Dayroom	Yes
Training, Meeting Room	Yes
Office Space	Yes
Washer/Dryer/Extractor	Residential
Fitness Area	In Bay – Limited Equipment
Protection Systems	
Fire Protection Sprinklers	No
Smoke Detection, Single Station, Monitored, Etc.	Single Station
Nitrous Dioxide, Carbon Monoxide, or other detection	No
Apparatus Exhaust Removal System	No
Other Fixed Fire Protection Systems	No
Exterior Features	
Apparatus Fueling System	Yes
Parking	Adequate
Fire Hydrant	
Building Access Control, Key, Card, FOB, etc.	FOB
Video Surveillance System	Yes

Figure 124: Dixie VFD, Station 2

The Dixie Station 2, remodeled and enlarged in 2009, is approximately 5,000 square feet. The apparatus housed in the bays include an engine, a tanker, and a brush truck. Overnight accommodations are provided for two. A remodel of the dayroom—office and kitchen—was well done. While the building is in good condition, due to age, additional future maintenance issues can be anticipated. The station does not appear to present any current significant maintenance concerns.

Basic Structure	
Construction type	Full Metal Clad
Date Built	1998
Last Remodel Date	2009
Special Considerations ADA, Gender Appropriate, etc.	No
Overall Condition, Excellent, Good, Fair, Poor	Good
Utility Services, Gas (N or P), Electric	None
Auxiliary Power, KW, Fuel Type	20 KW Natural Gas
Foundation	Slab on Grade
Green or LEEDS Certified	No
Square Footage	
Conditioned	1,800
Apparatus Room and Accessory Use	3,200
Total	5,000
Facilities Available	
Sleeping area	Two Beds
Locker, Showers	Yes
Kitchen, Dayroom	Combined
Training, Meeting Room	Bays and Dayroom
Office Space	Yes
Washer/Dryer/Extractor	Residential
Fitness Area	In Bay – Limited Equipment
Protection Systems	
Fire Protection Sprinklers	No
Smoke Detection, Single Station, Monitored, Etc.	Single Station
Nitrous Dioxide, Carbon Monoxide, or other detection	No
Apparatus Exhaust Removal System	No
Other Fixed Fire Protection Systems	No
Exterior Features	
Apparatus Fueling System	No
Parking	Adequate – Gravel
Fire Hydrant	No
Building Access Control, Key, Card, FOB, etc.	FOB
Video Surveillance System	Yes

Figure 125: Flint-Gresham VFD, Station 1

Flint-Gresham Fire Station 1, originally constructed in the 1970s, is approximately 4,000 square feet in space. At some point in the past, the building was expanded to add bay space. The facility has six bays fronting a narrow driveway and has a limited turn radius at the highway. The building displays signs of years of use and heavy wear. While functional, the building appears to be poor in condition. The apparatus housed in the bays include one engine, a tanker, brush truck, quint, command and staff vehicle. Overnight accommodations are provided for up to four personnel. An SCBA compressor is located in the bay. The station is scheduled for replacement to be completed August 2020.

Basic Structure	
Construction type	Block and lumber
Date Built	1970s
Last Remodel Date	Unknown
Special Considerations ADA, Gender Appropriate, etc.	No
Overall Condition, Excellent, Good, Fair, Poor	Poor
Utility Services, Gas (N or P), Electric	Electric – Propane
Auxiliary Power, KW, Fuel Type	20 kW Propane
Foundation	Slab on Grade
Green or LEEDS Certified	No
Square Footage	
Conditioned	800
Apparatus Room and Accessory Use	3,200
Total	4,000
Facilities Available	
Sleeping area	Yes
Locker, Showers	Yes
Kitchen, Dayroom	Kitchenette, Dayroom
Training, Meeting Room	Bay
Office Space	No
Washer/Dryer/Extractor	No
Fitness Area	No
Protection Systems	
Fire Protection Sprinklers	No
Smoke Detection, Single Station, Monitored, Etc.	Single Station
Nitrous Dioxide, Carbon Monoxide, or other detection	No
Apparatus Exhaust Removal System	No
Other Fixed Fire Protection Systems	No
Exterior Features	
Apparatus Fueling System	No
Parking	Limited, paved
Fire Hydrant	Yes, fill only
Building Access Control, Key, Card, FOB, etc.	FOB
Video Surveillance System	Yes

Figure 126: Flint-Gresham VFD, Station 2

The Flint-Gresham Station 2 constructed in 2010 is a facility with approximately 4,500 square feet of space. The apparatus housed in the bays include an engine, a tanker, and a brush truck. The ESD's quartermaster and bunker gear testing functions are located in the building. No overnight accommodations are provided. In the future, the building could be adaptable to provide sleeping quarters. The building most likely could not be enlarged due to the size of the lot. In the future, the ESD may be able to purchase the adjacent metal building to meet operational needs. While the building is in fair condition, future maintenance issues can be anticipated. The station does not appear to present any significant maintenance concerns.

Basic Structure	
Construction type	Full Metal Clad
Date Built	2010
Last Remodel Date	Unknown
Special Considerations ADA, Gender Appropriate, etc.	No
Overall Condition, Excellent, Good, Fair, Poor	Fair
Utility Services, Gas (N or P), Electric	None
Auxiliary Power, KW, Fuel Type	N/A
Foundation	Slab on Grade
Green or LEEDS Certified	No
Square Footage	
Conditioned	1,400
Apparatus Room and Accessory Use	3,100
Total	4,500
Facilities Available	
Sleeping area	No
Locker, Showers	Yes
Kitchen, Dayroom	Combined
Training, Meeting Room	Small Dayroom, Bay
Office Space	Limited
Washer/Dryer/Extractor	Extractor – Quartermaster Storage, ESD
Fitness Area	Off of Bay
Protection Systems	
Fire Protection Sprinklers	No
Smoke Detection, Single Station, Monitored, Etc.	Single Station
Nitrous Dioxide, Carbon Monoxide, or other detection	No
Apparatus Exhaust Removal System	No
Other Fixed Fire Protection Systems	No
Exterior Features	
Apparatus Fueling System	No
Parking	Not Adequate, need to complete paving
Fire Hydrant	750' North, same side of highway
Building Access Control, Key, Card, FOB, etc.	FOB
Video Surveillance System	Yes

Figure 127: Jackson Heights VFD, Station 1

The Jackson Heights Station is currently in need of major repair including what appears to structural damage in the two original bays. The newer section as seen in the photo is in good condition, but the driveway needs to have drainage control and be re-surfaced. Planning for remodel is currently being evaluated.

Basic Structure	
Construction type	Mixed Materials
Date Built	1978, 90s, and Current
Last Remodel Date	Currently
Special Considerations ADA, Gender Appropriate, etc.	No
Overall Condition, Excellent, Good, Fair, Poor	Poor is some portions, new on other areas
Utility Services, Gas (N or P), Electric	Gas – Electric (needs inspected)
Auxiliary Power, KW, Fuel Type	None – Needed with new service
Foundation	Slab on Grade
Green or LEEDS Certified	No
Square Footage	
Conditioned	500
Apparatus Room and Accessory Use	5,000
Total	5,500
Facilities Available	
Sleeping area	No
Locker, Showers	No
Kitchen, Dayroom	No
Training, Meeting Room	Bay
Office Space	Limited
Washer/Dryer/Extractor	No
Fitness Area	None
Protection Systems	
Fire Protection Sprinklers	No
Smoke Detection, Single Station, Monitored, Etc.	Single Station
Nitrous Dioxide, Carbon Monoxide, or other detection	No
Apparatus Exhaust Removal System	No
Other Fixed Fire Protection Systems	No
Exterior Features	
Apparatus Fueling System	No
Parking	Adequate
Fire Hydrant	No
Building Access Control, Key, Card, FOB, etc.	FOB
Video Surveillance System	No

Figure 128: Jackson Heights VFD, Station 2

This Jackson Heights Station was constructed in the 2010s. The building is a steel building. This facility has approximately 3,000 square feet of space. The apparatus housed in the bays include an engine, a tanker, and a brush truck. No overnight accommodations are provided. The small office area interior is constructed of wood studs and plywood. While this facility is in good condition, future maintenance concerns will appear. Funds to address these issues need to be budgetarily allocated to keep from deferring maintenance.

Basic Structure	
Construction type	Steel
Date Built	2010s
Last Remodel Date	N/A
Special Considerations ADA, Gender Appropriate, etc.	No
Overall Condition, Excellent, Good, Fair, Poor	New – good to excellent
Utility Services, Gas (N or P), Electric	Gas – Electric (needs inspected)
Auxiliary Power, KW, Fuel Type	20 KW Propane
Foundation	Slab on Grade
Green or LEEDS Certified	No
Square Footage	
Conditioned	1,000
Apparatus Room and Accessory Use	2,000
Total	3,000
Facilities Available	
Sleeping area	No
Locker, Showers	No
Kitchen, Dayroom	No
Training, Meeting Room	Bay
Office Space	Limited
Washer/Dryer/Extractor	No
Fitness Area	None
Protection Systems	
Fire Protection Sprinklers	No
Smoke Detection, Single Station, Monitored, Etc.	Single Station
Nitrous Dioxide, Carbon Monoxide, or other detection	No
Apparatus Exhaust Removal System	No
Other Fixed Fire Protection Systems	No
Exterior Features	
Apparatus Fueling System	No
Parking	Adequate
Fire Hydrant	Blow-off w/ 2.5" NST for refill
Building Access Control, Key, Card, FOB, etc.	FOB
Video Surveillance System	Yes

Figure 129: Noonday VFD, Station 1

The Noonday Station, constructed in 2002, is a facility of approximately 10,000 square feet in space. This facility is currently staffed 24 hours a day with limited facilities for 2 person crews. One area of concern is the lack of an apparatus exhaust removal system. Contaminants appear to be able to enter the living quarters and may have long term health effects.

Basic Structure	
Construction type	Full-Metal Clad – Brick Veneer
Date Built	2002
Last Remodel Date	
Special Considerations ADA, Gender Appropriate, etc.	No
Overall Condition, Excellent, Good, Fair, Poor	Fair
Utility Services, Gas (N or P), Electric	Gas – Electric
Auxiliary Power, KW, Fuel Type	35 KW Propane
Foundation	Slab on Grade
Green or LEEDS Certified	No
Square Footage	
Conditioned	2,000
Apparatus Room and Accessory Use	8,000
Total	10,000
Facilities Available	
Sleeping area	Yes
Locker, Showers	Yes
Kitchen, Dayroom	Combination
Training, Meeting Room	Dayroom, Bays
Office Space	Limited
Washer/Dryer/Extractor	Residential Washer Dryer
Fitness Area	In Bays
Protection Systems	
Fire Protection Sprinklers	No
Smoke Detection, Single Station, Monitored, Etc.	Single Station
Nitrous Dioxide, Carbon Monoxide, or other detection	No
Apparatus Exhaust Removal System	No
Other Fixed Fire Protection Systems	No
Exterior Features	
Apparatus Fueling System	Yes
Parking	Adequate
Fire Hydrant	
Building Access Control, Key, Card, FOB, etc.	FOB
Video Surveillance System	Yes

Figure 130: Red Springs VFD, Station 1

The Red Springs Station 1, constructed in 2006, is approximately 12,000 square feet in space. The facility has eight bays fronting the highway. The apparatus housed in the bays includes three engines (one tanker pumper), a tanker, three brush trucks, and a rescue. No overnight accommodations are provided. In the future, the building does provide limited sleeping quarters. The building is in good condition, and regular preventive maintenance has been performed. The station does not present any significant maintenance concerns. An SCBA compressor building is located to the rear of the main structure.

Basic Structure	
Construction type	Full-Metal Clad – Partial Brick Veneer
Date Built	2006
Last Remodel Date	N/A
Special Considerations ADA, Gender Appropriate, etc.	No
Overall Condition, Excellent, Good, Fair, Poor	Good
Utility Services, Gas (N or P), Electric	Electric – Propane
Auxiliary Power, KW, Fuel Type	45 KW Propane
Foundation	Slab on Grade
Green or LEEDS Certified	No
Square Footage	
Conditioned	4,000
Apparatus Room and Accessory Use	8,000
Total	12,000
Facilities Available	
Sleeping area	Yes – Upstairs
Locker, Showers	Yes
Kitchen, Dayroom	Yes – Kitchen Commercial Equipment
Training, Meeting Room	Upstairs
Office Space	Yes
Washer/Dryer/Extractor	Yes – Extractor
Fitness Area	No
Protection Systems	
Fire Protection Sprinklers	No
Smoke Detection, Single Station, Monitored, Etc.	Single Station
Nitrous Dioxide, Carbon Monoxide, or other detection	No
Apparatus Exhaust Removal System	No
Other Fixed Fire Protection Systems	Kitchen Hood Vent Extinguishing System
Exterior Features	
Apparatus Fueling System	Yes
Parking	Adequate
Fire Hydrant	Yes – Pony (Blow-off)
Building Access Control, Key, Card, FOB, etc.	FOB
Video Surveillance System	Yes

Figure 131: Red Springs VFD, Station 2

Red Springs Station 2 is co-located with the ESD 2 maintenance facility on the site of a former oilfield service facility. The station has two bays and is about 3,000 in size. Overnight accommodations are provided. The building is in good condition and regular preventive maintenance has been performed. The station does not present any significant maintenance concerns and is suitable for future expansion.

Basic Structure	
Construction type	Full-Metal Clad
Date Built	1980
Last Remodel Date	N/A
Special Considerations ADA, Gender Appropriate, etc.	No
Overall Condition, Excellent, Good, Fair, Poor	Good
Utility Services, Gas (N or P), Electric	Electric – Natural Gas
Auxiliary Power, KW, Fuel Type	45 KW Propane
Foundation	Slab on Grade
Green or LEEDS Certified	No
Square Footage	
Conditioned	1,400
Apparatus Room and Accessory Use	1,600
Total	3,000
Facilities Available	
Sleeping area	Yes, limited
Locker, Showers	Limited
Kitchen, Dayroom	Limited
Training, Meeting Room	No
Office Space	No
Washer/Dryer/Extractor	No
Fitness Area	No
Protection Systems	
Fire Protection Sprinklers	Yes
Smoke Detection, Single Station, Monitored, Etc.	Single Station
Nitrous Dioxide, Carbon Monoxide, or other detection	No
Apparatus Exhaust Removal System	No
Other Fixed Fire Protection Systems	No
Exterior Features	
Apparatus Fueling System	1700 gal
Parking	Yes
Fire Hydrant	Same as Block
Building Access Control, Key, Card, FOB, etc.	FOB
Video Surveillance System	Yes

Figure 132: Troup VFD, Station 1

The Troup Station constructed in 2012 is a facility of approximately 16,000 square feet in space. The apparatus bays are double deep and drive through configured. The bays house three engines, two tankers, four brush trucks, a rescue, a first response vehicle, command 14, plow/dozer trailer, and transport. No overnight accommodations are provided. In the future, the building could be adaptable to provide sleeping quarters. While the building is in excellent condition, future maintenance issues must be anticipated. The station does not present any significant maintenance concerns.

Basic Structure	
Construction type	Full-Metal Clad – Partial Brick Veneer
Date Built	2012
Last Remodel Date	N/A
Special Considerations ADA, Gender Appropriate, etc.	No
Overall Condition, Excellent, Good, Fair, Poor	Excellent
Utility Services, Gas (N or P), Electric	Gas – Electric
Auxiliary Power, KW, Fuel Type	35 KW Propane Generac
Foundation	Slab on Grade
Green or LEEDS Certified	No
Square Footage	
Conditioned	4,000
Apparatus Room and Accessory Use	12,000
Total	16,000
Facilities Available	
Sleeping area	No
Locker, Showers	Yes
Kitchen, Dayroom	Combination
Training, Meeting Room	Dayroom, Bays
Office Space	Limited
Washer/Dryer/Extractor	Residential Washer Dryer
Fitness Area	In Bays
Protection Systems	
Fire Protection Sprinklers	Yes
Smoke Detection, Single Station, Monitored, Etc.	Single Station
Nitrous Dioxide, Carbon Monoxide, or other detection	No
Apparatus Exhaust Removal System	No
Other Fixed Fire Protection Systems	No
Exterior Features	
Apparatus Fueling System	Yes
Parking	Adequate
Fire Hydrant	Yes
Building Access Control, Key, Card, FOB, etc.	FOB
Video Surveillance System	Yes

Figure 133: Troup VFD, Station 3

Troup Station 3 was constructed in 1985 and is approximately 2,400 square feet in space. The facility has three bays fronting a side road and is used for apparatus storage and back-up emergency response on the north side of the railroad tracks. The building is in poor condition; at this time, there are no plans to refurbish or improve this facility.

Basic Structure	
Construction type	Full Metal Clad
Date Built	1985
Last Remodel Date	N/A
Special Considerations ADA, Gender Appropriate, etc.	No
Overall Condition, Excellent, Good, Fair, Poor	Poor
Utility Services, Gas (N or P), Electric	Electric
Auxiliary Power, KW, Fuel Type	No
Foundation	Slab on Grade
Green or LEEDS Certified	No
Square Footage	
Conditioned	0
Apparatus Room and Accessory Use	2,400
Total	2,400
Facilities Available	
Sleeping area	No
Locker, Showers	No
Kitchen, Dayroom	No
Training, Meeting Room	Bay
Office Space	No
Washer/Dryer/Extractor	No
Fitness Area	No
Protection Systems	
Fire Protection Sprinklers	No
Smoke Detection, Single Station, Monitored, Etc.	No
Nitrous Dioxide, Carbon Monoxide, or other detection	No
Apparatus Exhaust Removal System	No
Other Fixed Fire Protection Systems	No
Exterior Features	
Apparatus Fueling System	No
Parking	Yes
Fire Hydrant	No
Building Access Control, Key, Card, FOB, etc.	FOB
Video Surveillance System	Yes

Figure 134: Whitehouse VFD, Station 1

This facility constructed in 2010 is in good to excellent condition. The facility stores a variety of well-kept apparatus. The station has a combined day/kitchen and meeting area. The building is capable of being adapted to include sleeping areas. The facility houses a bunker gear washer–extractor.

Basic Structure	
Construction type	Full-Metal Clad – Partial Brick Veneer
Date Built	2010
Last Remodel Date	N/A
Special Considerations ADA, Gender Appropriate, etc.	No
Overall Condition, Excellent, Good, Fair, Poor	Excellent
Utility Services, Gas (N or P), Electric	Electric – Propane
Auxiliary Power, KW, Fuel Type	45 KW
Foundation	Slab on Grade
Green or LEEDS Certified	No
Square Footage	
Conditioned	1,600
Apparatus Room and Accessory Use	6,400
Total	8,000
Facilities Available	
Sleeping area	No
Locker, Showers	Yes
Kitchen, Dayroom	Combined
Training, Meeting Room	Dayroom – Bays
Office Space	Limited
Washer/Dryer/Extractor	Yes – Extractor
Fitness Area	No
Protection Systems	
Fire Protection Sprinklers	No
Smoke Detection, Single Station, Monitored, Etc.	Single Station
Nitrous Dioxide, Carbon Monoxide, or other detection	No
Apparatus Exhaust Removal System	No
Other Fixed Fire Protection Systems	No
Exterior Features	
Apparatus Fueling System	Yes
Parking	Adequate
Fire Hydrant	No
Building Access Control, Key, Card, FOB, etc.	FOB
Video Surveillance System	Yes

Figure 135: Winona VFD, Station 1

The Winona Station 1 constructed in the 1980s is approximately 5,000 square feet. The apparatus housed in the bays include an engine, tanker, brush truck, and squad. An SCBA compressor is located in the bays. While the building is in fair condition, due to age, additional future maintenance issues can be anticipated. The station does not appear to present any current significant maintenance concerns.

Basic Structure	
Construction type	Full Metal Clad
Date Built	1980s
Last Remodel Date	None
Special Considerations ADA, Gender Appropriate, etc.	No
Overall Condition, Excellent, Good, Fair, Poor	Fair
Utility Services, Gas (N or P), Electric	Natural Gas – Electric
Auxiliary Power, KW, Fuel Type	20 KW Natural
Foundation	Slab on Grade
Green or LEEDS Certified	No
Square Footage	
Conditioned	1,000
Apparatus Room and Accessory Use	4,000
Total	5,000
Facilities Available	
Sleeping area	No
Locker, Showers	Yes
Kitchen, Dayroom	Combined
Training, Meeting Room	Bays and Dayroom
Office Space	Yes
Washer/Dryer/Extractor	Extractor
Fitness Area	In Bay
Protection Systems	
Fire Protection Sprinklers	No
Smoke Detection, Single Station, Monitored, Etc.	Single Station
Nitrous Dioxide, Carbon Monoxide, or other detection	No
Apparatus Exhaust Removal System	No
Other Fixed Fire Protection Systems	No
Exterior Features	
Apparatus Fueling System	Yes
Parking	Adequate
Fire Hydrant	Yes
Building Access Control, Key, Card, FOB, etc.	FOB
Video Surveillance System	Yes

Figure 136: Winona VFD, Station 2

Winona Station 2, constructed in the 1990s, is approximately 4,500 square feet. An expansion to the original building added two more apparatus bays. The apparatus housed in the bays include an engine, tanker, brush truck, and rescue. While the building is in fair condition, due to age, additional future maintenance issues can be anticipated. The station does not appear to present any current significant maintenance concerns.

Basic Structure	
Construction type	Full Metal Clad
Date Built	1990s
Last Remodel Date	N/A
Special Considerations ADA, Gender Appropriate, etc.	No
Overall Condition, Excellent, Good, Fair, Poor	Fair
Utility Services, Gas (N or P), Electric	Gas – Electric
Auxiliary Power, KW, Fuel Type	None
Foundation	Slab on Grade
Green or LEEDS Certified	No
Square Footage	
Conditioned	1,000
Apparatus Room and Accessory Use	3,500
Total	4,500
Facilities Available	
Sleeping area	No
Locker, Showers	Yes
Kitchen, Dayroom	Combined
Training, Meeting Room	Bays and Dayroom
Office Space	Yes
Washer/Dryer/Extractor	Residential
Fitness Area	In Bay – Limited
Protection Systems	
Fire Protection Sprinklers	No
Smoke Detection, Single Station, Monitored, Etc.	Single Station
Nitrous Dioxide, Carbon Monoxide, or other detection	No
Apparatus Exhaust Removal System	No
Other Fixed Fire Protection Systems	No
Exterior Features	
Apparatus Fueling System	Yes
Parking	Adequate
Fire Hydrant	Yes
Building Access Control, Key, Card, FOB, etc.	FOB
Video Surveillance System	Yes

Figure 137: Winona Fire Department, Station 3

The Winona Station 3, constructed in 2017, is about 3,400 square feet. The apparatus housed in the bays include an engine, tanker, and brush truck. The building is in excellent space and is well-maintained. The station does not appear to present any current significant maintenance concerns, and the is sufficient space for future expansion.

Basic Structure	
Construction type	Full Metal Clad
Date Built	2017
Last Remodel Date	N/A
Special Considerations ADA, Gender Appropriate, etc.	No
Overall Condition, Excellent, Good, Fair, Poor	Excellent
Utility Services, Gas (N or P), Electric	Electric – Propane
Auxiliary Power, KW, Fuel Type	20 kW
Foundation	Slab on Grade
Green or LEEDS Certified	No
Square Footage	
Conditioned	1,400
Apparatus Room and Accessory Use	2,000
Total	3,400
Facilities Available	
Sleeping area	No
Locker, Showers	No/Yes
Kitchen, Dayroom	Yes
Training, Meeting Room	Bays and Dayroom
Office Space	No
Washer/Dryer/Extractor	Yes
Fitness Area	No
Protection Systems	
Fire Protection Sprinklers	No
Smoke Detection, Single Station, Monitored, Etc.	Single Station
Nitrous Dioxide, Carbon Monoxide, or other detection	No
Apparatus Exhaust Removal System	No
Other Fixed Fire Protection Systems	No
Exterior Features	
Apparatus Fueling System	No
Parking	Adequate
Fire Hydrant	No
Building Access Control, Key, Card, FOB, etc.	FOB
Video Surveillance System	Yes

REFERENCES

[1] As defined by the U.S. Census Bureau, an urban cluster has the characteristics of an urbanized area, but contains at least 2,500 and less than 50,000 people. Within the District and based on 2018 population estimates, this definition applies to areas in and around Arp, Bullard, and Whitehouse. Other areas which are close to urban cluster status include the Dixie-Noonday-Flint Gresham area on the west side of the District.

[2] Fires in Texas: 2016 Annual Fire Statistics. Texas Fire Incident Reporting System, Texas State Fire Marshal's Office of the Texas Department of Insurance, October 2017.

[3] ERSI (2018).

[4] Smith County Profile (2018), Texas Association of Counties.

[5] Smith County ESD staffing records.

[6] Fleet Replacement Challenges Equal Opportunities, Bryan Brown, Fire and Emergency Apparatus, June 2017.

[7] Fatal Fires in Residential Buildings (2014–2016), Topical Fire report Series Volume 19, Issue 1/June 2018, U.S. Department of Homeland Security, U.S. Fire Administration, National Fire Data Center.

[8] Properties located more than five road miles from a fire station are rated as an ISO '10' classification.

[9] Risk-Based Inspection Programs: Hazard Classification by Occupancy Type, Mike Montgomery, 2019.

[10] https://www.fema.gov/media-library/assets/documents/28318.

[11] Retrieved from www.texaswildfirerisk.com.

[12] Homes include one- or two-family homes, including manufactured homes, and apartments or other multi-family housing.

[13] Home Fire Victims by Age and Gender, 2018 National Fire Protection Association (NFPA).

[14] https://tylerpaper.com/news/local/tyler-and-smith-county-growing-becoming-more-diverse/article_352579of-d431-56d2-99f2-2f2e2b710b9b.html.

[15] https://www.usfa.fema.gov/data/statistics/fire_death_rates.html#ans1.

[16] Adapted from "Community Risk Assessment and Standards of Cover," 6th edition; Center for Public Safety Excellence.

[17] Section 775.012 of the Texas Health and Safety Code, "Petition for Creation of District Located in More Than One County."